TELEPHONE ENGINEER and Management

"THE NATIONAL TELEPHONE MAGAZINE"

NOVEMBER, 1944

featuring -

WHAT HAS THE WAR TAUGHT US?

By

JOHN P. BOYLAN

President & General Manager Rochester Telephone Corporation, President United States Independent Telephone Association.

(An exclusive TELEPHONE ENGINEER article)

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EDITORIAL INDEX—Page 9

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THE COVER PICTURE

Lieut. Gen. Mark W. Clark, CG, Fifth Army, checks papers at his desk while Sergt. Geraldine Horne, WAC, speaks over the field telephone. Italy, Fifth Army.

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ALL TYPES OF LEICH TELEPHON

Our feature article this month is from the pen of John P. Boylan. It starts on page 28. We are unusually proud of the comment we have received on the series of executive articles carried in this magazine during this year. Mr. Boylan has presented a very timely subject and we ask you to give us your comments on the subject after digesting his discussion. By the way, a pencil sketch of Mr. Boylan was made by our artist to decorate the head.

▼

The advertising columns of this and other trade papers are getting more interesting each month. We think that section is one of the features of any magazine serving an industry such as ours as it enables all telephone men to keep up with technical developments in a "tell all" sort of way. Our readers tell us they find advertising an integral part of their reading.

▼

IMPORTANT: We are reproducing all of the text of the Amended WPB Orders U-2, U-3 and U-5. The amendments are now effective and we advise close study of each order as they are the rules under which we must run our business for the time being. Many of our subscribers tell us they clip the pages for ready reference.

R. W. S.

TELEPHONE ENGINEER AND MANAGEMENT

VOL. 48, No. 11 NOVEMBER, 1944

CONTENTS

- Editors Column 9
- 25 Years Ago in TELEPHONE ENGINEER 14
- AN EXCLUSIVE FEATURE
  What Has The War Taught Us?
  By John P. Boylan 28
- Coming Convention Dates 30
- Highlights of the Communication News
  By Roland C. Davies 31
- Editorial—It is Time to Become "Sales Minded" 32
- TELEPHONE ENGINEER'S Short Course
  Part XV—Section 2—Alternating
  Current Instruments 33
- The Observation Tower
  By the Observer and his Gang 36
- Amended WPB Orders U-2, U-3 and U-5 38
- USITA Committees 1944-45 42
- Line & Desk—Edited by J. S. Reed, Jr. 44
- Virginia Convention Report
  By Virginia Dull 50
- Personalities in the News 58
- TELEPHONE ENGINEER Handbook Tables 64
- Index to Advertisers 78

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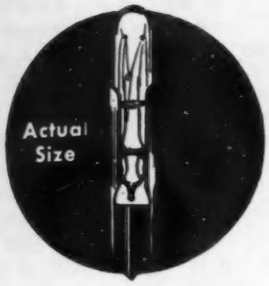

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8A–2	8	.080	.100	9	250
8B–2	8	.100	.120	7	320
10A–2	10	.100	.120	9	190
10B–2	10	.240	.260	4.5	560
12A–2	12	.090	.110	12	295
15A–2	15	.090	.110	15	275
16A–2	16	.090	.110	16	340
16B–2	16	.270	.310	5	610
18A–2	18	.035	.050	46	165
18B–2	18	.090	.110	18	350
20A–2	20	.060	.085	27	365
20B–2	20	.090	.110	20	355
24B–2	24	.035	.050	61	140
24C–2	24	.060	.085	33	535
24D–2	24	.090	.110	24	610
30A–2	30	.060	.085	41	670
30B–2	30	.090	.110	30	490
35A–2	35	.035	.050	89	300
35B–2	35	.060	.085	48	645
35C–2	35	.090	.110	35	445
40A–2	40	.060	.085	55	425
44A–2	44	.060	.085	61	630
48A–2	48	.060	.085	66	625
48B–2	48	.090	.110	48	600
48C–2	48	.032	.038	185	145
55B–2	55	.090	.110	55	440
55C–2	55	.045	.055	104	425
60A–2	60	.045	.055	113	525

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25 YEARS AGO THIS MONTH

Taken from TELEPHONE ENGINEER files of November, 1919.

"REAL ESTATE is being acquired, buildings planned, new switchboards installed, pole lines are changing to cable, overhead wires are going underground, and common battery is being substituted for magneto", TELEPHONE ENGINEER reports in November 1919. "Even the most cynical of old school telephone grumblers—the kind who have been saying for years that the telephone business was dead—are convinced that a veritable whirlwind of activity has sprung up." As you reminisce on these comments of one year after the armistice of the first world war, do you speculate on the changes and expansion ahead for the telephone business of today?

★

ARE YOU bothered by "B.D.R." or "C.G.C."? Did TELEPHONE ENGINEER in November 1919 enter the patent medicine field? Well, not exactly. V. N. Gregg, Central Union Telephone Co., Indianapolis, discussed systems of handling and recording trouble from the one man exchange to complaint tickets in large exchanges coded "Bell Doesn't Ring" and "Can't Get Central".

★

GULF storm damage from the Louisiana border to Brownsville on the Rio Grande was estimated in the November 1919 TELEPHONE ENGINEER and the heroism of telephone people in Brownsville, Corpus Christi and Galveston praised.

★

OF THE new telephone patents issued, according to TELEPHONE ENGINEER in November 1919, a tri-party connection allows on an automatic telephone system the called party to operate a selector switch to call another line, thus making possible connection and conversation among the three telephones. As the last party called may always be able to call another, it looks like all the members of the sewing circle may be connected for gossip any rainy afternoon. We wonder if this inventor contributed to the chain letter craze.

★

TO FASTER TELEPHONE PRODUCTION

Stromberg-Carlson's Expanded Drafting Department

Among the many departments of Stromberg-Carlson that have been tremendously increased since the start of the war is the Drafting and Blueprint Department of the Engineering Division. In this department is a personnel which has been increased by more than 100%.

At present, these people are busy on war work, including Sound Power telephones and switchboards for the Army and Navy, and switchboards for operating companies with suitable priorities. But, after Victory, this huge staff will be ready to provide an important link between engineering and production of peacetime telephone apparatus.

In addition to drafting work, this department also performs many important functions. It is equipped with Varityping machines for instruction books, and the most modern type of equipment for the rapid production of blue on white prints.

In this department will be found a photostating machine of the latest type and modern photographic equipment. With this photographic equipment, illustrations are made for instruction books. These are developed in a modern darkroom where also is done the important work of developing oscillograph films.

Developments of this type assure postwar telephone apparatus which even further exemplifies the slogan, *"There is Nothing Finer than a Stromberg-Carlson"*.

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WHAT has the war *taught* us ?

By JOHN P. BOYLAN,
President, Rochester (N. Y.) Telephone Company

PERHAPS many of you who read this article share with me membership in the Pioneer Association, which means that you have more or less grown up in the telephone business. It also means that you have hashed and rehashed telephone problems in terms of those which confront large companies and those which are associated with the companies doing business in the smaller communities. Perhaps you, too, have questioned the validity of segregating telephone problems through this universal implication that the problems of the large company are not encountered by the small company and vice versa, when our factual experience indicates that in the main there is a difference only in volume—not in character.

For example, doesn't the principal difference between maintaining a five position central office switchboard and a fifty position one grow out of the fact that in the latter instance a greater volume of trouble develops, the trouble which develops in both systems being essentially the same in character?

Isn't the character of the public relations of a company operating in a community of 5,000 people essentially the same as that of the company operating in a community of 100,000 people? In both cases it consists basically in rendering a type of service which will reduce customer complaints to a minimum. It is true that in the latter case you have more personalities to contend with, but here again we have the question of volume and not of type.

While the company which employs five people may not appear to be exposed to the problem of the returning soldiers, when we consider that they will be in the labor market for a number of years and that adjustments to civilian life will not happen overnight and also that there are very few families who do not have one or more of their members in service, a factor which will have an influence on every member of the family, can any company ignore the problem with a reasonable degree of security?

Let us, therefore, in considering the peacetime application of our war training, relegate to the sidelines this distinction between large and small companies and think in terms of the general telephone outlook.

OUR first consideration should be people—both those who assist in furnishing our service and those who are customers of it—and when we think of people, we cannot for a minute look beyond the immediate problems which will be created because some ten millions of them who have been living abnormal lives will be returned to a normal environment.

Immediately you may well ask what has this to do with an application of our war training. My answer is that all of us during the past few years have had without question some unusual experiences in handling employees and customers as the result of abnormal attitudes caused by the war economy, and we can continue to look forward for some time to come to a situation which involves dealing with abnormal attitudes. One thing this has taught is that we had to do the adjusting, we were the ones who had to change our sights.

Consider for a moment these 10,000,000 men. Some will be physically and mentally capable of stepping back into their old jobs. Some will be physically disabled and some mentally so. Some will have developed attitudes as the result of having assumed responsibilities far out of proportion to what ordinarily they would be asked to shoulder in civilian life, at least at the present stage of their careers, which will make it extremely difficult for them to return to civilian occupations. Speaking of attitudes, some will be profoundly affected because of their reaction to the conduct of civilians. Relative to this last point, I recently read a letter written by an officer of the Signal Corps. He wrote that while stationed in one of the western states, he hired a good telephone repairman for $38.00 per week on a forty hour week basis, and that after working about a month, the man left to take a job with a firm engaged in making destroyers at a wage of $125.00 per week. He went on to state that many of the boys in service recognized this as a typical situation and also recognized that men such as the one involved in this case frequently struck because they wanted more money for making these destroyers, which were manned by men who sometimes went down with them and who received a rate of from $50.00 to $60.00 per month. These aspects are but a few of the many ramifications which involve the man in service.

What will this require of us?

We mentioned first the physically capable veteran who applies for his old job. In his case the Selective Service Act provides among other things that if he was a regular employee and received an honorable discharge, he must be re-instated in his old job or a comparable one, provided the employee's circumstances have not changed to the extent that it would be impossible or unreasonable to do so, and provided he makes application within forty days of his honorable discharge. This last clause, incidentally, may be changed, at least in practice, since the time period appears inadequate. You will recall that at the time the Act was passed, Congress was thinking in terms of military training **in this country** and undoubtedly this forty-day limit was set because under such circumstances it offered an adequate time period. However, actual combat has changed the picture to the extent that it will be a physical impossibility for some of our former employees to reapply within forty days.

The phrase respecting the reasonableness of returning the employee to his job, based on the circumstances of the employee, may seem to offer a loop-hole. However, it should be borne in mind that the government and the courts will tend to waive legal niceties in order to protect these boys, and that therefore any company refusing re-instatement on these grounds will need to have available convincing proof. There are in this instance three other important considerations, as follows: The re-employment clause applies to **men** and **women**; it applies to all regular employees regardless of length of service; it requires that the man must be retained in his job for a year unless dismissed for cause.

NEXT we have the physically disabled. We know that in the past the physically handicapped had difficulty in securing jobs because we believed that every job required an able-bodied man, that is, one with the usual number of feet, arms, eyes, etc., and so we turned away the physically handicapped with deep sympathy and a sincere hope that someone would employ him. Our experience born of the manpower shortage has made this thinking obsolete. We have found that employment of this type of man, if properly placed, is just plain good business. Such people have proved to be

John P. Boylan

The author, John P. Boylan, president and general manager of the Rochester (N.Y.) Telephone Corporation, wrote "What Has the War Taught Us?" starting on the facing page of an exclusive feature for TELEPHONE ENGINEER & MANAGEMENT.

Only last month he was elected president of the United States Independent Telephone Association.

Mr. Boylan is an outstanding telephone engineer, a traffic man of long experience and a plant and commercial man of the highest caliber. His fifty-one years in the telephone business qualifies him to discuss the timely subjects contained in the article.

During the past few months, this publication has brought you a series of exclusive articles written for TELEPHONE ENGINEER & MANAGEMENT by outstanding executives in the field. Other exclusive treatises will follow.

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loyal and efficient workers. According to the Monthly Labor Review of September, 1943, such workers have proved to be loyal and efficient, have not developed a high rate of absenteeism, and have not proved to be accident hazards. These are pleasant thoughts because we are going to have hundreds of thousands of such people returning as war casualties. Far too many to permit us to assume a "let George do it" attitude.

Now let us consider the man who while in service had a responsibility of the type which he cannot expect when he returns to civilian life, or at least not at this stage of his career, and associated with this problem the man who has been trained as a specialist in a field in which he cannot find employment in his community and as a result must accept a job which does not utilize his top skill. These men will form a portion of the employee complement in some of the companies and cannot be treated with a "do it or else" attitude.

So much for the problem. Now what can we do about it in terms of application of our war training. It would be safe to say that some of the pitfalls which we have encountered in handling people during the past few years resulted because our thinking wasn't organized. The solution is therefore that you and I must make a thorough study of the whole question so that our thinking will be organized, so that we will know and anticipate attempting to develop all the answers so that as each man returns or is hired, we will merely have to look up our rules in order to handle the situation. On the contrary, these men must be treated as individual cases in an individual manner characterized by a high degree of tolerance and understanding of human nature.

This human nature factor for the same reasons will offer a glorious opportunity in the field of public relations. I would particularly recommend this to your attention because you will not have the advantage of having specialists in this field to the extent that the large companies will. As is customary with you, your customers' contacts and in some instances your determination of policies must be made by the person or persons who have the responsibility of carrying on other and varied functions. Your specialists, as has always been the case, are specialists in versatility. It will be necessary, therefore, for each of you to explore this matter of public relations thoroughly.

I refer to it as fertile ground because the public will have just emerged from a long period during which their wants, whims and needs were ignored by all and sundry. They will have the attitude which comes with being kicked around, with the result that any bending over-backwards to please cannot fail to endanger a high grade of relationship which could not be reached in any other kind of situation.

We have learned by war measures, some of which I will refer to in detail, that such can be gained by taking the public into your confidence, that the cloak of suspicion can be gradually removed if you do a job of educating the public and convincing them that your sole objective is good service at the lowest possible cost.

I REALIZE that taking advantage of this opportunity to develop good relations has its difficulties because of the training complications. The technique of contacting people and satisfying their wants and complaints does not lend itself to a formal training program and even if it did, it would not be practicable for many of you to attempt to conduct such a program. You can, however, accomplish much by taking the necessary steps to see that each employee is fully informed on company policy and aware of the limitations of the business insofar as such awareness is necessary in meeting the normal day to day problems. Furthermore, you can develop now the policies to be effective following conclusion of the war, bearing in mind those advantages that will permit capitalizing the public attitude.

A further thought in this connection is the possibility of continuing any of the war measures used to secure cooperation in improving the service because of their peacetime application. Perhaps this could be best illustrated by mentioning some of the measures which we have taken in Rochester.

Normally in the communications' business a basic phase of our job involves prompting the public to use the telephone as their chief communications' medium, and to avoid any measure or suggestion which might tend to turn the public away from the telephone to other avenues of communication. Obviously then, any scheme which tends to make telephonic communication more satisfactory, such as a plan for reducing the number of busy's, would work toward this objective.

Perhaps our Rochester wartime measure designed to reduce holding time so as to conserve central office equipment could have wide application for this purpose. I have in mind what we refer to as the three minute tone.

This three minute tone is an audible soft tone which is sent out over all "A" board cords at three minute intervals.

The timing of the tone does not start when the individual connection is established and as a result the customer may hear the first tone a few seconds after the conversation starts, or he may not hear it until almost three minutes have elapsed. When he hears a second tone, however, he knows that he has talked at least three minutes and as a result receives a gentle urge to speed up his conversation. On long distance connections the tone is not applied, and, as I indicated, the tone from two offices cannot get mixed nor is it heard on long distance connections, since it is sent out only over the "A" board cords.

OUR experience has been immediately after the tone was utilized, there was a 10% decrease in holding time, and as our newspaper and radio publicity took hold, there was an ultimate decrease of 15%.

One of the advantages in such a method is that it offers the customer

(Please turn to page 70)

Convention Dates

Missouri Telephone Association, Hotel Muehlebach, Kansas City, November 21 and 22.

Oklahoma Telephone Association, Hotel Huckins, Oklahoma City, November 27 and 28.

Texas Telephone Association, Hotel Baker, Dallas, March 12 and 13, 1945.

Kansas Telephone Association, Kansan Hotel, Topeka, March 15 and 16, 1945.

Iowa Telephone Association, Hotel Ft. Des Moines, Des Moines, April 3 and 4, 1945.

Nebraska Telephone Association, Hotel Lincoln, Lincoln, April 5 and 6, 1945.

United States Independent Telephone Association Executives' Conference, Edgewater Beach Hotel, Chicago, April 10 and 11, 1945.

Illinois Telephone Association, Hotel Pere Marquette, Peoria, April 19 and 20, 1945.

Ohio Telephone Association, Hotel Deshler-Wallick, Columbus, April 24 and 25, 1945.

Highlights of the Communications News

Important Communications developments of the past month, briefed for busy readers

by
ROLAND C. DAVIES
Editor, Telecommunications Reports

TERMINATING fifteen years of federal government service (the last five of which at the helm of the FCC), Chairman James Lawrence Fly went into private law practice Nov. 15 in New York City—as he described it "to make some money for my old age".

Even though he has had a stormy career and has been embroiled in one controversy after another with the broadcasting networks, the House investigating committee and other government departments, Chairman Fly certainly has been the "spark-plug" of the Communications Commission ever since he became chairman in 1939. He has a trigger-mind, plenty of ability and intelligence. He certainly was the most energetic chairman the FCC ever had.

Who will succeed Mr. Fly will not be known until Congress gets under way in the final lap of its session. Besides the Fly vacancy, the Commission has another, that of ex-commissioner T. A. M. Craven. Leading in the field for the Fly vacancy and as possible new chairman is Paul Porter, democratic national committee Director of Publicity and former CBS counsel in Washington. Another possibility for the chairmanship is Commissioner Clifford J. Durr. For the Craven vacancy, the name of Leighton H. Peebles, WPB Communications Division Director, has been advanced with considerable important governmental support.

Chairman Fly chalked up a number of achievements during his five years at the FCC. One was the merger of Western Union and Postal Telegraph. He also directed two major long distance telephone rate reduction inquiries which have meant an annual savings to telephone users, it is estimated, of $250,000. Last, but not least, has been his advocacy of the international communications merger, which is still unsettled. It is deemed certain that he will be called back into the international communications situation in an advisory capacity.

Surplus Equipment

ACTUAL sales of surplus communications equipment through declaration to the disposal agencies have been comparatively small and the surpluses have come entirely from the Army, W. L. Clayton, Surplus War Property Administrator, announced Nov. 9 in his report to Justice James F. Byrnes, War Mobilization Director, on the activities of the SWPA since its creation, Feb. 21, 1944. The Administration had disposed of $85,007,000 worth of surplus property by Sept. 30 and has on hand $465,207,000.

So far, no declarations of surplus property have been made to the RFC by the Navy, Maritime Commission and other departments, Mr. Clayton reported. The larger amounts of surplus in the communication field, his report stated, have so far resulted from the termination of contracts, although none of these surpluses has been declared to the RFC.. He noted that the Signal Corps, at present, is endeavoring to clear termination claims through having prime contractors dispose of resulting inventory from terminal war production contracts.

The largest declaration by the Army is some $13,300,000 cost value of vacuum tubes, the Clayton report cited, and nearly half of these tubes have been returned to original manufacturers for disposal under contract agreement and will be promptly sold for government account. The Army has declared as surplus about $270,000 of wired and wireless communications apparatus, but disposal of this equipment has been delayed pending discussions with manufacturers.

Mr. Clayton stated that much of the Administration's work has been concerned with making plans for disposal of the large surpluses to be expected with the completion of operations in the European theatre. "It seems likely that communications surpluses at that time will largely result in this country from terminated contracts and a reduction in depot stocks," the report continued, "and in Europe, from fixed installations, any excessive reserve stocks, and heavier, bulky materials which it may be decided unwise to move to other theatres, such as poles and possibly lead-covered cables. Other usable equipment is likely to be shipped to, or reserved for use in other theatres."

DESCRIBING the objective of the contract to make original manu-

(Continued on page 46)

A group from the Virginia Independent Telephone Association convention, photographed by J. O. Martin, C. & P. Telephone Co., Washington, D. C. (Other pictures from the convention are on page 50.) Standing L. to R.: Judge Robert O. Norris, State Corp. Commission, Richmond, Va.; J. O. Martin; F. M. Parsons, Kellogg Switchboard and Supply Co., Chicago, Ill.; G. Fred Switzer, Harrisonburg Telephone Co., Harrisonburg, Va.; A. W. Harrison, C. & P. Telephone Co., Richmond, Va.; Kelley McNish, Bristol, Tenn.; R. W. Mason, Richmond, Va.; Rodney Coggins, E. Coast Telephone Co., Warsaw, Va.; Mrs. G. Fred Switzer, Harrisonburg, Va.; John Shaw, A. T. & T. Co., New York, N. Y.; Frank LaPrade, Lee Telephone Co., Martinsville, Va.

EDITORIAL

It is Time to Become "Sales Minded"

IN its report to the October national convention, the USITA Committee on Postwar Plans and War Activities made some statements and suggestions about long-term postwar telephone growth that we believe are worthy of serious consideration by the entire Independent telephone industry.

After saying that it believed that there would be large postwar growth of telephone stations over the long term, due to increase in the population and greater per capita use of the telephone, the Committee went on to say:

> "We submit, however, that a large long-term postwar growth in telephone stations does not necessarily mean that Independent companies will receive their pro rata share of such growth unless they act on their own behalf to obtain it. It is a generally known fact that station growth is usually smaller, on a percentage basis, in smaller cities and towns —in which most Independent companies operate—than in the large metropolitan centers.
>
> "We recommend, therefore, that all Independent companies plan and organize now to sell telephone service. Such efforts should be directed at retaining as many as possible of the stations gained during the war and to selling additional residence extensions when they can again be installed. When the held order situation existing at the end of the war has been taken care of, telephone service should be sold to the many people of every community and exchange area who do not then have it. We believe, in other words, that Independent companies should become 'sales minded' in order to obtain their due share of the postwar growth in telephones."

We think the Committee is right.

The increase in the number of telephones in service during all the years from the inception of the business to the setback caused by the recent great depression, and the increase since that time, resulted on the whole, we believe, more from the initiative of those who wanted telephones than from selling activities by telephone companies.

Many telephone men have felt that subscribers gained by selling campaigns were not stable, long-term subscribers. We doubt whether that is really a fact. We have seen figures compiled by one large Independent company over a five-year period prior to 1941, which show that the percentage of removals of stations sold in selling campaigns was not substantially larger than removals of telephones installed on the sole initiative of the subscriber.

Even if the percentage should be somewhat higher, many long-term subscribers are obtained through selling campaigns that would never be obtained otherwise.

WE believe, as the Committee suggests, that if the Independent industry is to obtain its full share of station growth during the post war long-term, the industry must go after that business, and not simply wait for it to come-along of its own accord.

We believe that instead of periodical and spectacular "selling campaigns" the Independent industry should gear itself for constant selling of service; that it should, so to speak, substitute the equivalent of a sales department, working every day at selling service, for sporadic selling campaigns.

Constant, non-spectacular growth is much better for the industry, from various standpoints, than a short period of heavy growth every now and then.

Here is a proposition, we think, in which the entire industry can join in a helpful manner by the creation and interchange of selling ideas, and so on. The time will soon be here when such ideas can be put into practice—when the "sales department" of the telephone company can begin to function.

We hope to do our part in the proposition by submitting in our columns, from time to time, specific ideas, plans and proposals for a continuous sale of telephone service after the war.

Telephone Engineer's TRAINING COURSE

☆

ELECTRICAL FUNDAMENTALS FOR THE TELEPHONE MAN

☆

Alternating Current Instruments--Part XV (Section 2)

Theory of Operation

THE voltage to be measured is applied to the grid of the 78 tube and to the ground posts on the voltmeter. Before connecting the voltage to be measured to the input terminals the grid should be shorted to the ground connection by means of a switch which is provided but which is not shown in the diagram. The zero adjuster should then be turned so that the microammeter reads exactly zero volts. After this adjustment is made, the input voltage may be applied and can be read directly on the scale. The reading obtained is in terms of effective voltage.

Fig. 57.—Weston Model 669 Vacuum Tube Voltmeter

A study of the schematic circuit will show that in changing from one voltage range to another, the switch automatically changes the plate voltage and the grid bias voltage. The positive plate voltage and the negative grid voltage is increased as the range is increased. For example the 16 volt range has the highest negative grid bias and the highest positive plate voltage.

The frequency range of this vacuum tube voltmeter is almost unlimited, extending from power frequencies, telephone frequencies, through to the ultra-high frequencies. On extremely high frequencies slight errors will occur due to tube capacity (frequencies of 10 to 20 megacycles, for example). The impedance from grid to cathode of the 78 tube is practically infinite; hence, no load is placed on the circuit under measurement. Fig. 57 illustrates the compact, neatly designed case in which the Model 669 is housed.

Frequency Meters

IN dealing with alternating current circuits it is often necessary to determine the frequency of the current source by measurement. Different types of instruments are required for frequency measurements in the low, medium and high frequency ranges. That is, an instrument suitable for measuring frequencies in the range of say 20 to 133 cycles (power frequencies) could not ordinarily be used on audio or radio frequencies. There are a number of different basic types of frequency measuring instruments, which are known respectively as:

Type	Useful Range (Cycles)
1.—Tuned reed type	(15 to 70)
2—Induction type	(15 to 70)
3—Electronic type	(0—5000)
4—Bridge type	(20—20,000)
5—Hetrodyne type	(50,000—5,000,000)
6—Resonant type	(16,000—50,000,000)

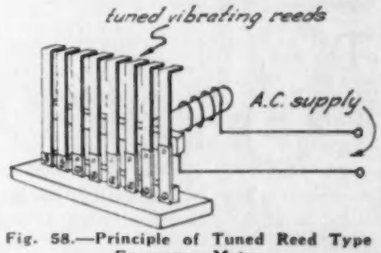

Fig. 58.—Principle of Tuned Reed Type Frequency Meter

Tuned Reed Type Meter

THE vibrating reed type meter determines frequency by means of a number of tuned reeds of different lengths mounted in a row as shown in Fig. 58 and all simultaneously subjected to electro magnetic impulses from an electro magnet connected to the source whose frequency is to be measured. The reed whose natural frequency is nearest to that of the impressed source will vibrate through a

wide arc while the other reeds remain practically still. The reeds are arranged in front of a window and directly below a calibrated scale. This type meter has a very limited frequency range (15-70 cycles approximately) and is used primarily in the power field.

Induction Type Frequency Meter

THE induction type frequency meter utilizes the effect of the frequency under measurement passing through two fixed coils one of the coils being in series with a resistance and the other an inductance. The resultant field causes an indicator needle attached to a movable soft iron vane to move over a calibrated scale. As the frequency increases the current in coil A decreases while it increases in coil B which causes the soft iron to move so as to embrace the maximum number of lines of force. Fig. 60 illustrates schematically the arrangement of coils, network and soft iron vane. Induction type frequency meters are used only on the lower frequencies hence are primarily used in the power field.

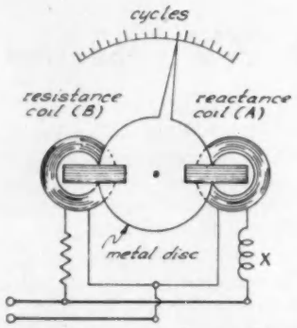

Fig. 60.—Principle of Induction Type Frequency Meter

Electronic Type Frequency Meter

THE electronic frequency meter consists essentially of an electronic counter and D.C. calibrated indicator. A typical meter of this type made by General Radio Co. has a range of 0-5000 cycles. It is used for a wide variety of measuring applications as well as in class room demonstrations.

The circuit is shown in Fig. 62. Action is as follows: The A.C. voltage whose frequency is to be measured is connected to the grid of the vacuum tube T1. This voltage is amplified and applied to the grids of two gas discharge tubes, each tube becoming alternately conducting and non-conducting. The current flowing first to one tube and then the other passes through a direct current milliammeter whose scale is calibrated in cycles. The meter reading depends on the number of rectified current pulses per second, and is calibrated in cycles.

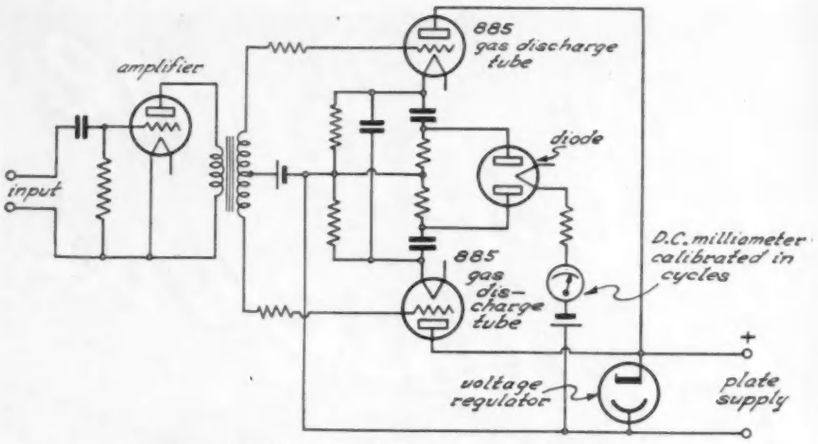

Figure 62.—Circuit of Electronic Frequency Meter.

Bridge Type Frequency Meter

FOR use in the telephone and sound field a **bridge type frequency meter** is often used. These meters have ranges of approximately 20 to 20,000 cycles and consist of a **Wien type** bridge circuit with headphones to determine the null balance point. The frequency in cycles is read directly from a calibrated dial.

Referring to Fig. 64 the ratio of the A and B arms of the bridge which are pure resistance can be varied by the dial which is calibrated in cycles. The X and R arms contain fixed capacities and resistance networks. The impedance across the capacity arms will depend on frequency and will increase as the frequency decreases. The ratio dial of arm A to B permits adjusting the impedance of the four arms so that a null balance can be obtained and the frequency thus determined from the calibrated dial setting.

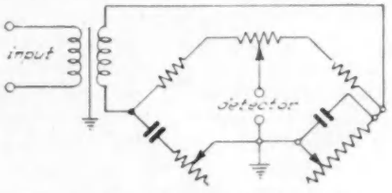

Fig. 64.—The Bridge Type Frequency Meter

Hetrodyne Type Frequency Meter

THE hetrodyne frequency meter is widely used in the radio research and manufacturing field. It consists essentially of an adjustable calibrated vacuum tube oscillator and a vacuum tube detector. The frequency under measurement is "mixed" with the frequency of the calibrated oscillator whose frequency is adjusted for zero beat. The frequency of the unknown source is then determined from the setting of the calibrated oscillator.

Instruments of this type having ranges extending from 50,000 to as high as 30,000,000 cycles are available. The basic circuit of a hetrodyne meter is shown in Fig. 65.

Resonant Type Frequency Meter

ONE of the simplest types of frequency measuring units (for use on radio frequencies) is that which employs the resonant characteristics of a condenser and inductance in series. Usually a flashlight bulb or a thermo couple milliammeter is placed in the series circuit to indicate resonance. The meter is held close to the source under measurement and the variable condenser slowly turned until the circuit is in resonance which is indicated by the bulb lighting up or by maximum de-

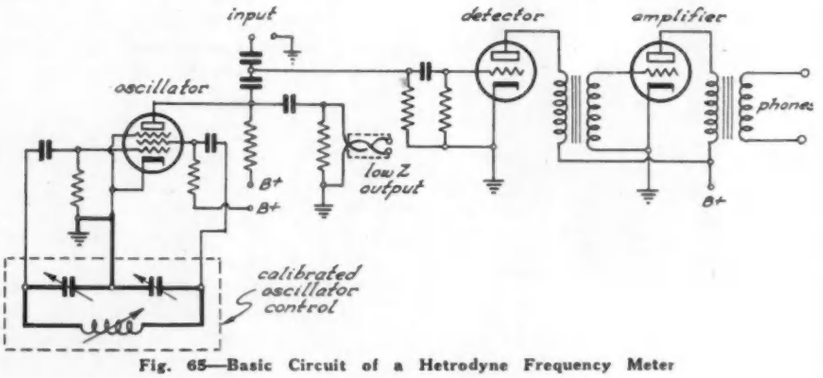

Fig. 65—Basic Circuit of a Hetrodyne Frequency Meter

flection of an R. F. meter. The dial is calibrated in cycles, or kilocycles.

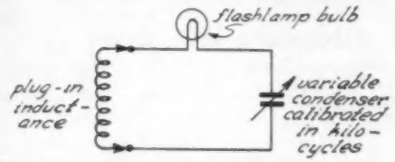

Fig. 66.—Circuit of Resonant Type Frequency Meter

This type of instrument is often referred to as a **wavemeter,** and is primarily useful for measuring frequencies in the radio range. The calibration is based on the relationship.

$$fr = \frac{0.1592}{\sqrt{LC}}$$

Where fr = resonant frequency in cycles: L = henries, C = farads.

The basic circuit of the resonant type frequency meter is illustrated in Fig. 66.

Capacity Measuring Instruments

THE measurement of capacity is often necessary in dealing with both A.C. and D.C. circuits. If we wish to determine merely the capacity of a condenser the measurement is relatively simple. If we also wish to know the power factor of the condenser the measurement is more complex. The two principal methods of measuring capacity are:

1—A. C. milliammeter in series with source of fixed voltage and frequency,

2—By means of a bridge circuit.

Direct Reading Capacity Meters

THE simplest type of capacity meter is one consisting of an A.C. milliammeter in series with the condenser under measurement and a 110 volt 60 cycle power source. The capacity measurement is based on the capacity reactance formula which states:

$$Xc = \frac{1}{2\pi fc}$$

where: Xc = reactance in ohms
f = frequency in cycles
c = capacity in farads.

From this formula it can be seen that the reactance of a condenser increases as the capacity decreases, hence, the smaller condenser under test the smaller will be the current flowing through the A.C. milliammeter. The

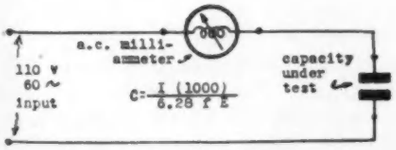

Fig. 68.—Principle of A.C. Milliammeter in use as a Capacity Meter

milliammeter scale is calibrated so that it shows capacity for any reading in milliamperes. Fig. 68 illustrates this principle.

A typical instrument of ths type is the Weston Model 664. This instrument makes use of a 250 microammeter rectifier type A.C. meter and is capable of measuring capacity values as low as .0002 m.f. and as high as 200 m.f. A.C. voltages in the range 0-800 volts can also be measured. A multi-contact switch (see circuit given in Fig. 69) cuts in the various shunts and series resistance to give the desired ranges.

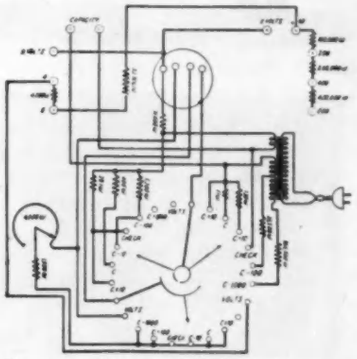

Fig. 69.—Circuit of Weston Capacity Meter

A 4000 ohm variable resistor is used to adjust the line voltage to a fixed value so that the calibration of the instrument will be accurate. The circuit is so arranged that only 4 volts are applied to condensers whose capacities fall in the range of 200 to .02 m.f. For measuring lower capacities the rotary switch cuts in 40 to 92½ volts. It is necessary to raise the voltage on the lower capacity condensers in order to get sufficient current through the meter to give readable deflections. A low test-voltage is desirable on the higher ranges as electrolytic condensers having low peak voltage ratings would break down when tested at too high a voltage.

Bridge Type Capacity Meters

LABORATORY measurements involving capacity usually make use of some form of a bridge measuring circuit. Such circuits can be made highly accurate and have a wide measuring range. Some capacity bridges permit measurement of both the capacity and power factor of condensers. The simplest type of capacity bridge utilizes a circuit as illustrated in Fig. 70. The circuit consists essentially of a standard capacity C_0 the unknown capacity C_x, a variable R_1—R_2 ratio resistance arm, a pair of headphones which serve as a null detector, and a source of tone. The current from the tone source passes through the two branches R_1—R_2 and C_0—C_x in inverse proportion to the impedance of the two paths. By proper adjustment of the re-

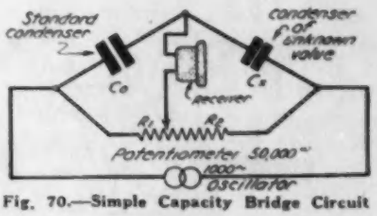

Fig. 70.—Simple Capacity Bridge Circuit

sistance of arm R_1—R_2 the current in the two branches can be made in such proportion that zero voltage will appear across the headphones. Under this circumstance the unknown capacity is equal to: $R_1 : R_2 :: C_x : C_0$ or

$$Cx = \frac{R_1\ C_0}{R_2}$$

On most bridges of this type a potentio-meter type R_1—R_2 arm is used, hence the capacity can be calibrated directly on the dial which controls the setting. Switches are provided for cutting in standard condensers of different values in order to increase the range of the bridge. The more expensive bridges in addition to measuring capacity as just described also measure the power factor of the condenser under test.

A. C. Wattmeters

THE measurement of power requires an instrument which will show the combined effect (product) of voltage and amperage. An instrument that shows the instantaneous power being consumed in a circuit is known as a **wattmeter.** If a meter shows the product of power and time it is referred to as a **watt hour meter** (or **kilowatt hour meter).**

A wattmeter consists essentially of a fixed coil which carries the current flowing to the load and a movable voltage coil to which is attached an indicator needle. The movable coil is connected across the circuit hence acts as a voltage coil. The axis of the two coils are so arranged that the movement of the movable coil is **proportional to the product of the instantaneous voltage times amperage.** A typical A.C. wattmeter is shown in Fig. 72.

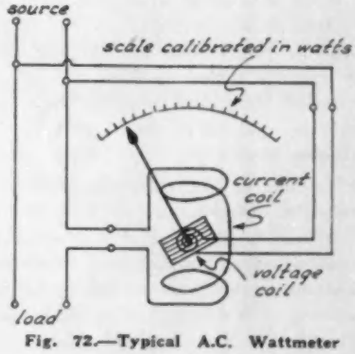

Fig. 72.—Typical A.C. Wattmeter

(Please turn to page 68)

Conducted by the
Observer and his Gang

THE Observation Tower

If you have observations or even a friendly bit of argument suitable for use in this column, you are invited to send them along, which automatically makes you a member of the Gang. You will be anonymous—no names of telephone people or telephone companies are used in the column. Address "The Observer", in care of TELEPHONE ENGINEER AND MANAGEMENT.

"How You Gonna Keep 'Em Down on the Farm?"

GANGSTER No. 69, who wanted to raise a rumpus several months ago because the telephone industry wasn't hitting it in high about the farm telephone situation, tells us that he feels pretty good about all the attention that was paid the proposition at the October national convention.

He says the farm telephone question just seemed to pop up in a dozen places, which he takes as an indication that great minds—including his own—do run in the same channel.

No. 69 opines that this farm telephone problem is just about the biggest subject the telephone industry has to deal with now. He thinks the industry has got to find the answer to it and, in his opinion, it is not going to be answered by just a lot of conversation.

The fellows at the grass roots of the industry, he says, probably know a lot more about the subject right now than anybody else. By those fellows he means the people who are operating small exchanges in agricultural areas, whether the exchanges are individual companies, or the small exchanges operated by the larger companies.

"What the committees and other folks working on this problem should do," advises No. 69, "is to get hold of the telephone people who are rubbing shoulders every working day with the farmers. These guys may not know the answer to the problem, but certainly they know what the problem really is—and we've got to find out before we mix up the medicine to cure it."

"The fact is," he continues, "the farm telephone problem is quite a different kind of problem in various parts of the country. It's one kind of a problem in the Southwest, for instance, where ranches run to thousands of acres and a telephone on every ranch means tremendously long circuits resulting in few telephones; it's another kind of problem in, for instance, New England, where farms are usually small and farm telephones would be pretty close together."

"We're stringing along with No. 69's ideas on this proposition—in fact, we think we're maybe a little ahead of him. Five months ago we said that the way to get at the root of this farm problem was to go ask a lot of farmers what they thought about it. We still think that's a good idea. We don't believe anybody is going to settle the farm telephone problem unless it is settled to the satisfaction of the farmers themselves. We have a sort of feeling that we'd all know a lot more about what would satisfy the farmers—and make them enthusiastic users of the telephone on a basis that was economic from the money standpoint—if we could get that information direct from the farmers.

Free! Free!

IF you want some, or more, of our Hospitality Cards, drop us a line—a postcard will do—while we've got some on hand. If you're not already a Gang Member, that makes you one, and you'll receive your membership card, too.

Each Hospitality Card (when certain, simple conditions printed on it are complied with), gets you one glass of beer.

Which reminds us that we should inform Gang Members that we've been harassing the editor of this magazine to get us some Christmas cards to send to Gangsters. We went about it the wrong way at first; we thought you could get things from an editor by kindness. Well, you can't!

So now we've told him that if he doesn't come across with our Christmas cards, we're going to print in this column a few little inside facts that we happen to know about him. We think that'll get the cards.

We don't mind indulging ourselves in a little blackmail when we know it's in a good cause.

What About Telephone Side Lines?

GANG MEMBER NO. 48, who is normally a silent sort of critter, has blossomed out with a question that should interest a lot of telephone people. Has anybody, asks No. 48, actually developed any kind of services auxiliary to telephone service that is important and profitable? If so,

what is it?

Well, we don't just exactly know. We do know that during the depression a number of companies tried out various kinds of special services designed to be revenue producers and also to make the telephone itself more valuable to the subscriber. It is our impression, however, that most of these propositions faded out as times got better, and that none of them resulted in a really important and commercially stable revenue producer or important auxiliary service.

Ten or fifteen years ago some companies tried selling a music service over their lines to their subscribers—whether any such service as that is still offered directly by telephone companies, we don't know. During the depression there were several different plans of popularizing farm telephones by broadcasting special offerings from local merchants over the farmer lines. It is our impression that in most cases this service was abandoned after economic conditions became more normal.

We understand that the so-called "secretarial service" has panned out pretty well at some good-sized exchanges, but we got that from trade gossip, so don't depend on it.

In other words, we don't know much of anything about the whole proposition. We hope that somebody who does know something about it will tell us what they know. It's a very intriguing subject, and we'd like to tell not only Gangster No. 48, but also the rest of you, something definite about it.

Our personal feeling about this question of auxiliary services as creators of additional revenues for telephone companies, is and has been for a long time that the same amount of time, effort and money spent on increasing sales of the two real things we have to sell—good old "local and long distance"—will in the long run produce more net earnings for the company. But maybe we're entirely wrong about that—according to our wife, we're frequently wrong about a lot of things.

As methods of popularizing telephone service and use, auxiliary services of one kind or another may have a great deal of merit. But from the standpoint of gross and net revenues, none of them, so far as we know, have been developed to the point where they cut much ice, and we doubt if any will be.

Of course, as we have said, we may be entirely wrong. If you think so, tell us.

"Cherchez La Femme"

YOU Gangsters will please take off your hats hereafter when reading this column—we now have a lady member! She's in the telephone business, and probably a lot better at it than most of you ham-handed males. Also, she agrees with something we said, which shows that she is highly intelligent.

We've decided to call her a Gangstress, and her number is 150.

Gangstress No. 150 thinks we were right when we agreed with Gang Member No. 87, who is an auditor, in his contention that more people in telephone organizations should know something about telephone accounting and the effect of their actions upon the earnings statement and balance sheet. She has another reason, also a good one; when her company's office manager was jerked suddenly into the army and she and a companion had to take over the work all of a sudden, they had to start from scratch. That, of course, made a lot of otherwise unnecessary work.

We think it would be a splendid thing if the theory and, to a reasonable extent, the practice of telephone accounting were made familiar to all the principal people in a telephone organization. We think that would help bring about the highest type of intelligent management. Certainly it would be a fine thing for everyone connected with the accounting and commercial departments to know accounting—and would help take care of situations like Gangstress 150 had to face.

Why So Shy, Ladies?

WE'D like to have some more lady Gang Members, not only to keep Gangstress No. 150 company, but also—amongst many reasons—because we're so gosh-awful tired of contemplating all those masculine mugs that now make up our Gang membership.

In normal times—i. e., in times when there aren't so many Rosie Riveters at work—the telephone industry probably has a larger percentage of women in it than any other large industry. So come on and speak your piece, ladies, and if you want to tell the men in the business where to head in, we'll go right along with you.

For Those Who Believe in Signs

WE'VE started a collection of mottoes, or slogans, or whatever they ought to be called, to hang on the walls of the Observation Tower. A Gang Member instigated the proposition by sending us two mottoes which, he says without shame, he copped from some magazine advertisements. He thinks they're pretty good, and so do we.

One of them is: "YOU CANNOT SUCCEED BY NOT DOING THINGS."

The other: "BEATEN PATHS ARE FOR BEATEN MEN."

If you have a favorite motto or slogan, send it in and we'll put it in this column. We might even be able to get some of them printed for Gang Members some day in size and form to hang on your wall.

How Old is the Oldest?

AS you may remember, we sent out our Snooper No. 4 a couple of months ago to find the oldest man and oldest woman in the Independent telephone business. No. 4, being as slow as the seven year itch, has not yet made his report, but meanwhile Gangster No. 174 has tossed a candidate's hat in the ring. This candidate is a gentleman who has until recently been active in the management of an Independent exchange at the age of 85.

Unless Snooper No. 4 or somebody else comes up with someone older than that, our odds are on this candidate. Meanwhile, what about the ladies—or do they simply refuse to talk about their age?

A Matter of Relativity

STOP reading if you've heard this one: A traveling man went into a crossroads country store and found no customers around and no business going on. Instead, the proprietor had a checker board across a barrel-head and was playing checkers with his dog.

"Do you mean to say," asked the visitor incredulously, "that that dog is actually playing checkers?"

"Sure," said the merchant placidly, "I taught him how so as to help kill time."

"Why, man," asked the salesman, "do you know what you've got there? You could go into vaudeville and clean up a fortune with a dog as smart as that!"

"Heck," retorted the merchant disgustedly, "he ain't so smart. I beat him the last three games."

Complete Text of

Amended

WPB Orders U-2, U-3 and U-5

(ISSUED OCTOBER 30, 1944)

EMPHASIZING that modification of telephone orders U-2, U-3 and U-5, which were issued Oct. 30, will give operating telephone companies a maximum freedom of operation, especially in small expansions and improvement of their plants, consistent with the present demands of the war program, WPB Communications Division Director Leighton H. Peebles transmitted an administrative letter with copies of the revised orders to approximately 2,500 telephone companies Nov. 2.

As the result of changes in U-2 and U-3, Mr. Peebles advised the telephone companies that they "will be able to undertake a greater proportion of their small construction without the need of obtaining specific approval of the War Production Board". It was indicated that U-5 may be cancelled in the near future in line with the general WPB policy to remove all priority rating floors except for military scheduling. This would mean a further modification of U-2 with respect to subsection (b) (3) and (f) to avoid interfering with the manufacture and installation of small automatic PBX's as the present form of U-5 leaves the way open for intercommunicating equipment manufacturers to compete in this field.

The administrative letter of Mr. Peebles, in its exposition of the modified order, follows:

"The amendment of Order U-2 has eliminated controls on the installation of exchange central office equipment and on the replacement of central office equipment, station apparatus and PBX systems, except the replacement of PBX systems with dial equipment. Schedule A has been amended to specifically include the Veterans Administration.

"The dollar ceilings of Order U-3 have been increased, both for obtaining new material with priority assistance and for the amount of non-priority material which may be used without obtaining authority to begin construction. The amended Order allows an operator to use the AA-3 rating and the allotment symbol U-9 to obtain materials and equipment for construction projects involving between $2,500 and $10,000 of material obtained under the Order. Construction projects requiring $2,500 or less of material obtained under the Order may still use the AA-1 rating and U-9 symbol. However, together with the aforementioned amounts of priority material obtained under the Order an operator may also use non-priority material so long as the total quantity of material does not exceed $25,000. For the purchase of telephone sets operators may use the AA-3 and may not use the AA-1 rating.

"The definition of 'operator's inventory' has been changed in that certain minor items may no longer be excluded from inventory. The dollar value of materials offered for sale that may (at the operator's option) be excluded is limited to the amount offered for sale and listed with the War Production Board as of June 30, 1944. The permissible inventory limits of wire, cable or strand have been increased from 60 to 90 days' requirements.

"Since September 18, 1944, construction work on buildings used in connection with telephone or certain telegraph operations has been subject to Order U-3 (but not to Order L-41). The amended Order U-3 makes the restrictions set forth in Appendix I of Schedule A to CMP Regulation 6 applicable to building construction under the Order.

"Order U-5 as amended no longer contains the requirement that a purchase order for communications equipment placed with the manufacturer or supplier must bear a preference rating. This modification permits operators to plan for postwar construction and will enable manufacturers to build up a backlog of non-war orders. In addition, the list of restricted items in Schedule A of Order U-5 has been substantially reduced. Further, the Order has been amended so that 'parts or attachments thereto' are not subject to the Order, but merely the items specifically listed on Schedule A."

Text of U-2
War Production Board

PART 4501—COMMUNICATIONS

[Utilities Order U-2, as Amended Oct. 30, 1944]

General Conservation Order for Telephone Industry

(a) Definitions.
(b) Conservation.
(c) Availability of facilities for essential uses.
tial uses.
(d) Limitation on additional telephones.
(e) Limitation on drop and block wire.
(f) Limitation on replacements.
(g) Limitation on additions.
(h) Non-applicability to certain replacements and additions.
(i) Producers of substantial quantities of food.
(j) Exemption of armed forces.
(k) Engineering and planning.
(l) Reports.
(m) Records.
(n) Appeals.
(o) Violations.
(p) Communications.
Schedule A.
Schedule B.
Schedule C.

§4501.1 Utilities Order U-2—(a) Definitions. (1) "Operator" means any individual, partnership, association, business trust, corporation, receiver, or any form of enterprise whatsoever, whether incorporated or not, the United States, the District of Columbia, any state or territory of the United States, any political, corporate, administrative or other division or agency thereof, to the extent engaged in rendering telephone communication service within, to, or from the United States, its territories or possessions.

(2) [Revoked July 17, 1944.]

(3) [Revoked Oct. 30, 1944.]

(4) [Revoked July 17, 1944.]

(5) [Revoked July 17, 1944.]

(6) "Schedule A service" means service to the extent required for the proper discharge of duties in the direct defense, public health, welfare and security categories listed on Schedule A attached.

(7) "Interim service" includes all service installed or reconnected on and after **April 15, 1943** which requires an allocation or assignment of exchange central office station terminal equipment or exchange line plant. It also includes any service installed prior to that date according to a contract specifying that the service was on an interim basis.

(b) **Conservation.** (1) Operators shall conserve scarce and cratical materials by the employment of all practical methods.

(2) [Revoked **Jan. 20, 1944**]

(3) Operators shall discontinue the further installation of dial P. B. X. systems and dial private intercommunicating systems. This provision does not prevent the installation of systems of less than 100 lines where the equipment is already in the stock of the operator or can be obtained from the stock of another operator. Nor does it bar additions to dial systems. Nor does it bar moves for the same business service within the same exchange area, or to a contiguous exchange area of the same operator.

(c) **Availability of facilities for essential uses.** (1) Operators shall disconnect service when they learn that the present real user of service is not a user contemplated in the service agreement. Any such disconnections shall be considered "normal disconnections" within the meaning of paragraph (c) (2) below.

(2) Exchange line plant, exchange central office equipment, or telephone sets made available through normal disconnection or by new acquisition shall be used to take care of applications for service in the following order:

(i) Schedule A service, public pay station service and service specifically authorized by the War Production Board because of essentiality or unreasonable hardship.

(ii) Changes of address of business service within the same exchange or to another exchange of the same operator within the same metropolitan area or within such other area as is defined by the operator's established practices; and, within the same area, restoration of business "interim service" disconnected to make facilities available for Schedule A service.

(iii) Changes of address of residence service within the same exchange or to another exchange of the same operator within the same metropolitan area or within such other area as is defined by the operator's established practices; and, within the same area, restoration of residence "interim service" disconnected to make facilities available for Schedule A service.

(iv) New business service and additions to existing business service.

(v) New residence service set forth in Schedule B.

(vi) New residence service set forth in Schedule C.

(vii) New residence service other than that included in categories (i), (v) and (vi.)

(viii) Where the operator finds that immediate installation of service is essential to the protection of life, such installation may be made as an exception to the order provided in the above categories. Such service shall, however, be disconnected promptly at the termination of the emergency and the facilities used to take care of applications as otherwise specified above.

3) Idle facilities may be reserved to the extent operators find necessary to meet promptly the known or fairly anticipated requirements for Schedule A service and to provide for essential public pay station service.

(4) To the extent necessary to meet minimum needs for Schedule A service and for essential public pay station service, operators shall make available additional exchange central office equipment or exchange line plant by regrading any service or disconnecting "interim service" under the following provisions:

(i) "Interim service" shall not be subject to disconnection so long as it continues to meet the requirements of Schedule A service or essential public pay station service.

(ii) Regrading is to be done only when current installations of central office equipment permit. Regrading of Schedule A service or essential public pay station service.

(ii) Regrading is to be done only when current installations of central office equipment permit. Regrading of Schedule A service and of business service is to be done only if regraded service meets minimum service needs.

(iii) In so far as practical these steps shall be taken in the following order. Regrading shall precede disconnection. Residence service shall be regraded or disconnected before business service. Any regrading or disconnection shall be in the reverse order of the dates of connection at the existing locations, that is, the most recent shall be regraded or disconnected first.

(Please turn to page 60)

BUY BONDS

Hometow

SATURDAY, NOVEMBER 4, 1944

LOCAL TELEPHONE C

Complete, Modern Telephone Service Rendered by Hometown's Automatic Exchange Is Valuable Asset to the Entire Community

BY YOUR ROVING REPORTER

Two views in Exchange of Hometown Telephone Company, showing the Automatic switches that handle all connections

I just came home from a trip. And, folks, from now on, I'm more than ever a booster for Hometown and the many advantages we have here.

Take our automatic telephone service, for example. In the town where I spent my vacation, telephone service is still of the old-fashioned kind. I had a real chance to judge the service we have in Hometown. Let me tell you, it's good!

Here in Hometown, our automatic exchange is ready for service every second of the day and night. There is no waiting for an operator, and it takes only a few seconds to dial a call. You are signaled instantly if the called line is busy; when your call goes through, you know it because you can actually hear the phone ringing at the other end of the line. There is little chance for wrong numbers what you dial, you get. And when you "hang up" it takes only a fraction of a second to release the connection ready for another call. All of this adds up to the very finest telephone service it is possible to get anywhere.

Hometown's automatic telephone service is one of the things that have made Hometown a great little city. Let's not get it!

John Randall, genial manager of the Hometown Telephone Company, says, "We've proved to our own satisfaction that it's good business to give the best possible telephone service. Why, I even have subscribers

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In these communities, newspapers and civic organizations endorse Strowger Automatic service as a vital aid to better living and better business; and telephone users approve in the way that counts most—by willingly paying rates that make telephone operation a sound and successful business.

In short, these telephone companies have "made good"—both for themselves and for the public they serve.

In the postwar years, public favor for your company and your service will be more vital than ever. We are ready now to show you how Strowger Automatic equipment can help you reach this goal. Ask our field representative to work with you.

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Clyde S. Bailey, Alternate

Telephone Committee, X

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Clyde S. Bailey, Alternate (to R. I. Mabbs, of A.T.&T., representative from Committee X)

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Radio Communication, Panel 8

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B. C. Burden, Member

American Standards Assoc.

B. C. Burden, Representative

U. S. Chamber of Commerce

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H. F. Lello Named Sales Manager Of Automatic Electric

H. F. Lello was recently appointed sales manager of Automatic Electric Sales Corporation, according to an announcement by T. S. Gary, President of the company. In his new capacity, Mr. Lello will assume direct supervision of all sales and service operations both home office and field.

H. F. Lello

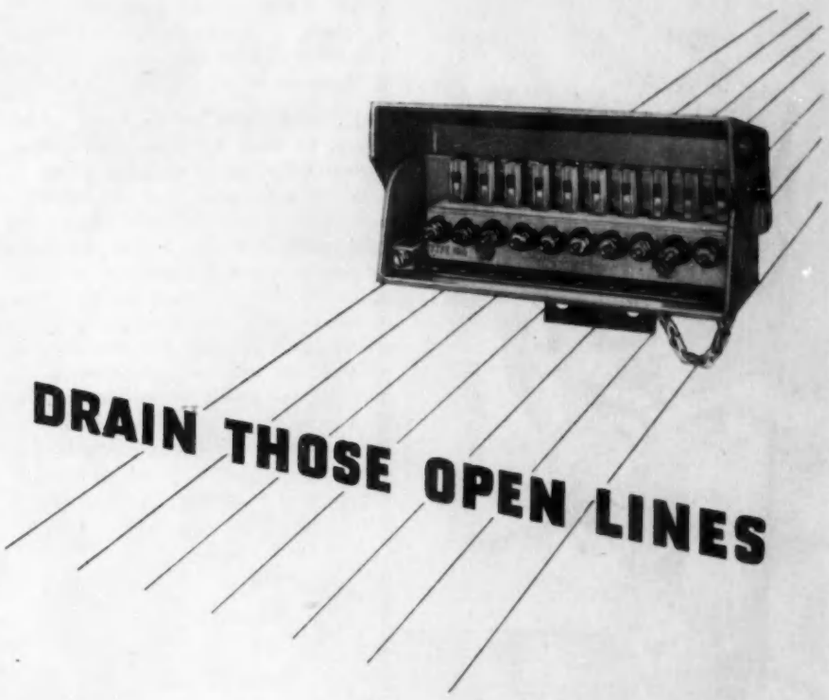
With almost twenty years of varied experience with Automatic Electric Company and its domestic distributor, Automatic Electric Sales Corporation, Mr. Lello entered the employ of Automatic Electric Company in 1923 in the factory time keeping department. In 1935, he was appointed manager of the pricing and estimating division, and in that capacity became thoroughly familiar with sales, engineering and manufacturing problems.

Mr. Lello was transferred to the domestic sales organization in 1939 as assistant to the vice president and sales manager.

Seven days after Pearl Harbor, when it became clear that Automatic Electric would be required to put forth extraordinary efforts to help supply the fighting forces with communication equipment for war, Mr. Lello was recalled to the manufacturing organization to serve in a staff capacity in charge of production scheduling.

Longton, Kansas Exchange Sold

B. B. Strieby, who has been associated with the Sac County Mutual Telephone Company in Odebolt for the part 22 years, has resigned his position and has purchased a telephone exchange at Longton, Kan.



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The Automatic Electric Type 19A Crossarm Arrester provides five pairs of cutouts, with convenient terminals for connecting the jumpers from five lines; another terminal takes the ground-wire connection. The entire unit mounts readily on a crossarm or pole. It is enclosed in a light-weight weatherproof housing of sheet metal, with durable weather-fighting finish.

SEND FOR THIS CATALOG

The Type 19A Crossarm Arrester is shown and completely described in our Catalog 4068-A, "Automatic Electric Telephone Protection Apparatus," which also describes the other protection products of Automatic Electric Company. Your copy of this catalog will be sent promptly on request.

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Edited
J. S. REED, JR.

LINE and DESK

Q. How is it possible to increase the accuracy of the Wheatstone Bridge in measuring resistances in the order of several megohms? Our bridge will measure accurately only to four digits of the figure.

A. Use a "precision wound" resistor of a definite value across the "X" posts of the bridge connected to the unknown resistance, the value of which is to be accurately determined. Compute the value of the unknown resistance from the following formula:

$$R_x = \frac{R_1 \times R_2}{R_2 - R_1}$$

Where R_x=Value of unknown resistance in ohms

R_1= Value of precision resistor in ohms

R_2=Parallel resistance of the combination of R_x and R_1

Q. What type of protector block should be used for protection against crosses with high voltage circuits.

A. In sub-station and central-office protectors 350-volt blocks should be used while 700-volt blocks are considered proper for junctions of cable with open-wire lines one-half mile long or longer. A protector that closes the air gap and grounds the line directly, permanently or for the duration of the high voltage cross, is considered safer than an ordinary protector with blocks that ground the line only when the foreign current jumps the air gap, as in the case of protector blocks equipped with mica spacers.

Q. Is the use of the spinner method ot supporting cable from a messenger crossing a railroad permissible?

A. Because of the corrosive action of locomotive smoke on galvanized steel, it is advisable to use Copperweld messenger strand with Copperweld wire lashing in the span crossing the railroad. In addition, zinc strap hangers should be used at the pole on each side of the railroad. However, the particular railroad company should be consulted before attempting any type of wire crossing construction over their railroad.

Q. How can squirrels be kept from gnawing the insulation on drop wire attached to the guard arm or to a span fixture on the messenger?

A. The most effective method that we have heard of so far is to attach a 12-inch length of #109 iron wire to the guard arm hook or span fixture and fasten the drop wire clamp to the other end of the wire extension. This method will keep the drop wire out of reach of the most ambitious squirrel.

Q. What is the value of having low resistance ground at protected terminals and subscriber stations?

A. A low resistance ground enables a direct lightning stroke or an inductive surge from a bolt striking nearby to expend its energy in the ground, instead of shunting through telephone apparatus. Many telephone drops have been ruined by lightning as the result of poor grounds at the substation. A good low resistance ground can be made in moist soil such as in valleys and swamp land. In the case of grounds made at a subscriber's station, it is a good idea to drive a six foot copperweld rod not less than one foot from the residence foundation.

Q. Which would result in better protection to drop wires passing through trees, the use of ordinary drop wire with loom or other protective covering or the so-called braid-resistant drop wire?

A. Experience over a number of years with various methods of preventing abrasion of drop wire indicates that best results are obtained when the drop wire is properly routed so as to avoid trees and shrubbery in the path of the wire. The use of span clamps provides a very satisfactory method of routing drops past trees. If the drop wire can pass underneath tree limbs with sufficient clearance from the ground, it is feasible to undertrim the trees to remove twigs and small branches in the way of the wire. When it is impossible to avoid passing the drop through trees, the wire should be protected with loom as shown in Figure 1. Drop wire clips

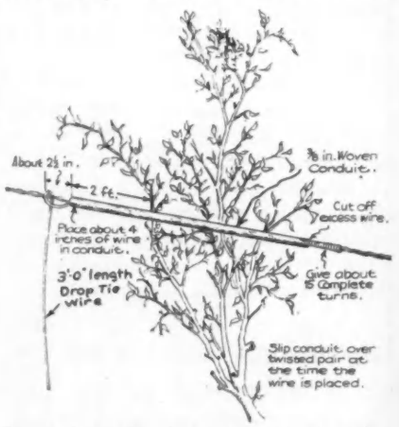
About 2½ in.
2 Ft.
¾ in. Woven Conduit.
Cut off excess wire.
Place about 4 inches of wire in conduit.
3'-0" length Drop Tie wire
Give about 5 Complete turns.
Slip conduit over twisted pair at the time the wire is placed.

Fig. 1. Protecting drop wire in tree branches with flexible loom (woven conduit).

with the tab cut off may be utilized in place of the drop tie wire.

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Highlights of the Communications News

(Continued from page 31)

facturers disposal agents, as a means of handling these surpluses "in an orderly manner", the Clayton report stated that the ratio of sales of such government surplus stocks to the manufacturers' own stocks is left open, as in some instances it may be possible for the manufacturer to move all the government stock before he is in a position to produce his own product and in other instances it may be necessary to sell a much smaller percentage of government-owned stocks in order to allow the manufacturer to keep his factory in operation and employ labor.

"It is thought, however, that these manufacturers should sell the government stock **at least as fast as their own,"** the Clayton report stated significantly. "The contracts will be followed very closely to make sure that the government's interest is being protected, and where manufacturers contend that there is no possible sale for certain equipment, other opinions must be obtained from independent sources."

Radio Telephone

THE telephone industry—Bell System and Independents—presented the FCC Allocations hearing with a constructive and potent description of their plans to engage in new radiotelephone services in the postwar era.

The American Telephone & Telegraph Co. and the Bell System emphasized the importance of the general mobile telephone service, built upon the uses and improvements by the armed forces in the prosecution of the war, and emphasized that the frequencies sought for this new radio service could be shared in short-haul toll, rural telephony and maritime mobile service. The Independent industry, supporting the same frequency assignments, through witnesses representing the U. S. Independent Telephone Association and the Gary Group of Independent operating companies, stressed, in addition, the use of radiotelephone for toll and subscriber service to reach users in isolated sections of the country.

That the Bell System companies are prepared to play their full part in the development of the relatively new form of communications — general mobile telephone service—, if suitable frequency allocations are made, was stressed by Francis M. Ryan, Radio Engineer of the American Telephone & Telegraph Co. The frequencies allocated for the urban and highway

A Complete Treatise on Telephony

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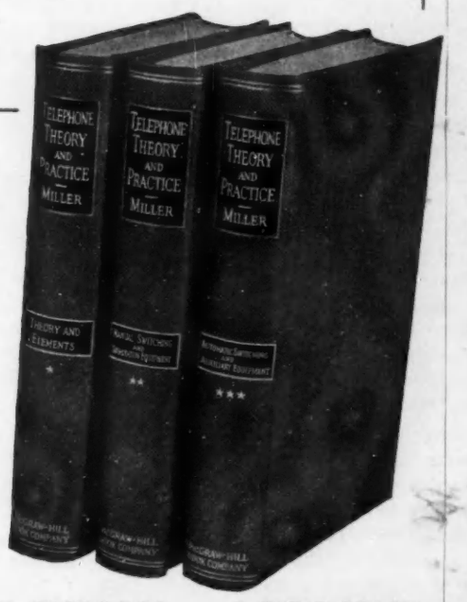

Features of these books are the clear, understandable treatment; the simple language employed; and the profuse illustrations with drawings and photographs of actual apparatus and circuit diagrams.

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CENTRALIA MISSOURI

mobile service would be shared with rural and short-haul toll in outlying areas, maritime mobile service and common carrier emergency radio service. He proposed frequency allocations in the range of 50 to 200 megacycles without designating specific frequencies so as to provide the greatest possible latitude for fitting this service in with the others. He recommended 188 channels for urban service and 32 for highway service.

On the program for mobile service, short-haul toll and rural telephony services and for emergency services, the A. T. & T. engineer was joined by the Independent industry spokesman, B. C. Burden, former Engineer of the United States Independent Telephone Association, and now a consulting engineer at Lincoln, Nebraska.

The Independent telephone industry, Mr. Burden stated, is convinced that there is a genuine field of use for radio channels of the "regional frequency type" for common carrier telephone purposes in the role of a "supplementary rather than a replacing use".

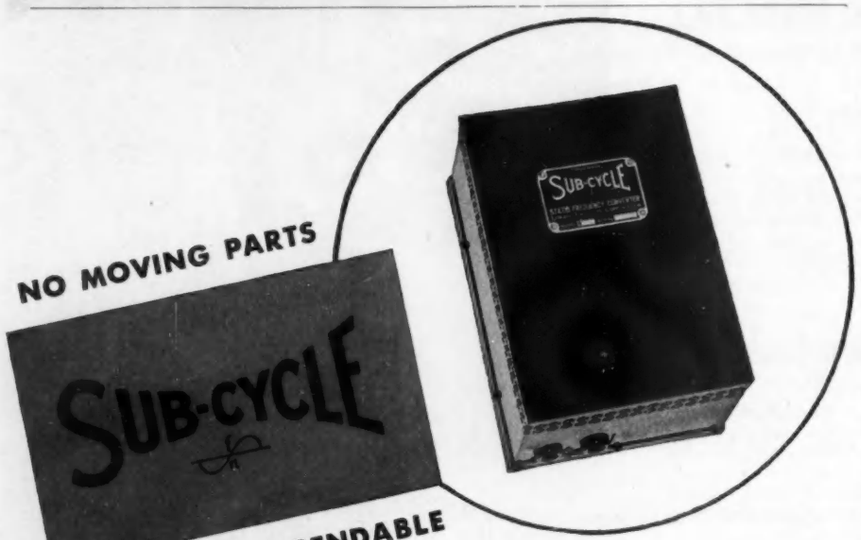
"We are thinking both in terms of some new common carrier telephone services", Mr. Burden declared, "which can be rendered by means of radio as well as certain other telephone services for which radio channels are the only practical means of transmission even though it may be physically possible to use wire lines. We further believe that radio channels could play an important supplementary part in our toll systems which would be in the public interest and which would fit into the future requirements of television networks."

Unless the telephone industry is permitted to share in the frequency assignments now being opened up above 100 megacycles, Mr. Burden felt there will be "a missing link in our communications system". For radio channels to serve isolated communities and families, he proposed 40 frequencies to provide 20 channels. These would provide telephone service for isolated communities where it is not feasible to construct or maintain wire lines such as mountain resorts and communities, mining and lumber camps and offshore islands, particularly in states in which population density is low and distances between populated points are large. He stressed that demand for this type of service is limited but such service is nevertheless needed, sometimes acutely. Another field is to furnish telephone service to farmers, ranchers and others living so far from wire lines as to make such telephone construction costs prohibitive.

V. E. Chaney, in charge of all the Gary System Operating Telephone Companies, had a statement of the needs of his thirty-five affiliated Independent companies put in the record without reading it. Mr. Chaney's statement emphasized to the FCC that the allocation by the Commission of adequate and appropriate frequencies for use and experimentation by telephone companies "would be in the highest sense responsive to the public convenience and necessity". He declared that he could visualize the use of radio facilities as offering many possibilities of expanding and supplementing the present telephone wire communication services.

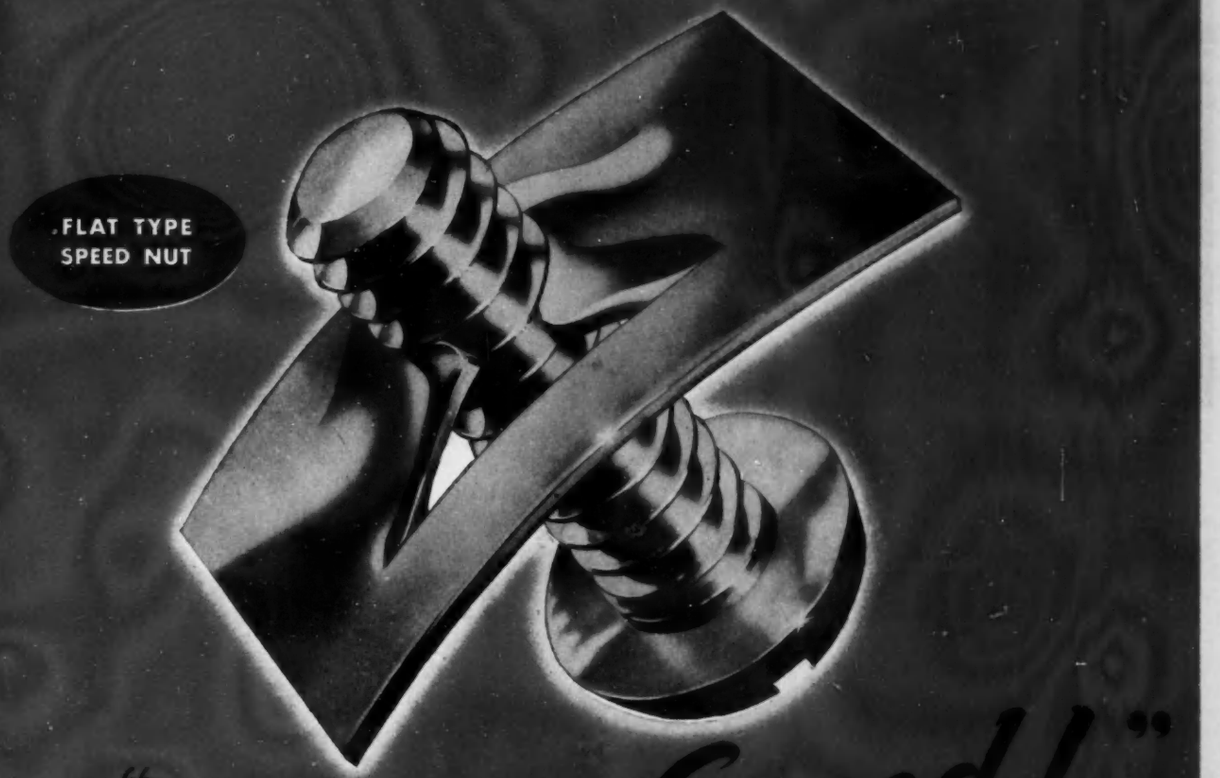
One or more of his own telephone operating companies will, in the near future, apply to the FCC for frequencies to operate experimental stations for short-haul toll purposes and for other services, Mr. Chaney's statement cited. One of these companies has more than 5,000 miles of wire toll circuits rendering short-haul toll traffic and with many of these toll leads heavily loaded. He forecast in his statement that radio could be used in part to handle this expanded toll traffic. After citing how microwaves can be used simultaneously without interference in many places throughout the country and after picturing the postwar uses of radio in a variety of fields of safety, transportation, mobile serv-

(Continued on page 56)

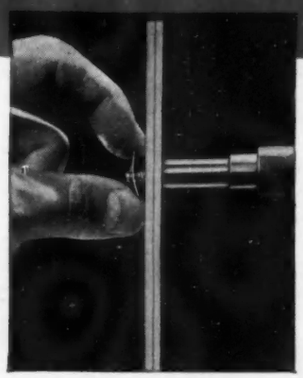


MASTER RINGING CONVERTERS
ARE DISTRIBUTED BY
AUTOMATIC ELECTRIC
SALES CORPORATION
1033 WEST VAN BUREN STREET, CHICAGO 7, ILLINOIS

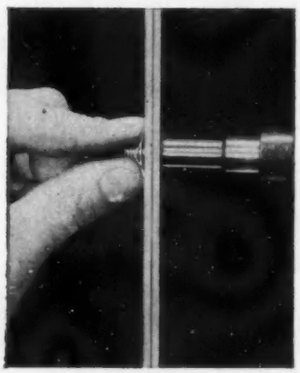
ONE OF A SERIES PORTRAYING THE "SPEED NUT FAMILY OF FASTENINGS"



"...AND WE DO MEAN *Speed!*"



STARTING POSITION



LOCKING POSITION

Greater *Speed* Reduces Assembly Time
Greater *Speed* Cuts Assembly Costs

● This ad is devoted to speed. The word appears 5 times in this message because we want to stress speed first and foremost.

Why? Because you will need better and faster assembly speed in order to win postwar markets in big volume on any product—metal, wood, or plastics.

Designing beautiful postwar products is only the beginning. The winners will be those good looking products that are engineered for better and faster assembly. We have already produced over 2,000 shapes and sizes that have drastically cut assembly time, reduced costs and improved the quality of the finished product. Write for literature.

TINNERMAN PRODUCTS, INC.
2017 Fulton Road, Cleveland 13, Ohio
In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London

Speed Nuts ★ Patented — Trademark Reg. U. S. Patent Office

FASTEST THING IN FASTENINGS

Group picture of members and suppliers attending the Virginia Independent Telephone Association at Roanoke October 26 and 27. (All Convention picture courtesy J. O. Martin, Chesapeake & Potomac Telephone Company.)

Virginia Convention Report

By ELIZABETH DULL

THE 10th Annual Convention of the Virginia Independent Telephone Association at Hotel Roanoke, Virginia, October 26th and 27th was an outstanding success. One hundred fifty-three members, associate members and suppliers were registered.

Kelley McNish, of Bristol, Tenn., 1944 president of the Association, presided at the opening luncheon, introducing special guests of the Association, which included from the Chesapeake & Potomac Telephone Company, Howard O. Leinard, William H. Trapnell, J. O. Martin, George A. Culton; from the Norfolk & Western Railway Company, John George; and Major Chipock from Camp Pickett, Virginia; also George Northington, Rolland McNutt, and Mrs. Kelley McNish, Jr., the latter from Australia.

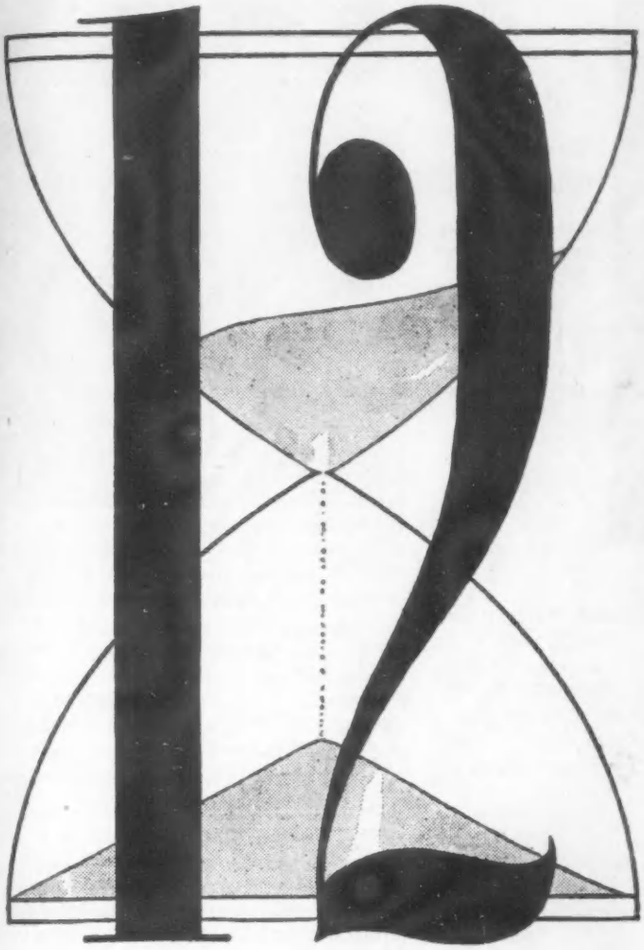
Officers and directors of the Virginia Independent Telephone Association. Back Row: L to R—Stanley Owen, Kelley McNish, Dr. George B. Cocke, J. P. Borden. (Mr. Borden is the new president of the Virginia Association.) Front Row: L to R—Lloyd Pulley, Frank LaPrade, A. E. Reynolds, Rodney Coggins. (All of the above named are members of the board of directors, except Mr. Reynolds and Mr. Coggins.)

Clyde S. Bailey, executive vice president of the United States Independent Telephone Association, who has endeared himself to so many of the Virginia people, as well as to other telephone people throughout the United States for his friendly, and always helpful assistance in any problem arising concerning telephony, then brought to the one hundred eleven members present, an address on present day problems and post war developments in the Telephone Industry. Mr. Bailey's command of English, his sparkling wit and forceful manner make him a welcomed speaker at any gathering of telephone people.

Following Mr. Bailey's address, C. C. Ward, in the absence of R. A. Phillips, gave a report of the advertising committee, introducing Miss Betty Gray of Chicago, representative of the Telephone Advertisement Institute, who had with her a most attractive display of various types of advertising.

At the business session of the convention, following the luncheon, Mr. McNish called on J. P. Borden, secretary-treasurer of the association for his report.

Mr. McNish then expressed his appreciation to the members of the association for their support during his year in office and mentioned particularly the excellent work done by Mr.



12 MONTHS

of Valuable Service to BUYERS *and* SELLERS

of equipment and supplies used in the telephone industry is the mission of the

1945 TELEPHONE "BLUE BOOK" and BUYERS' GUIDE

To be published January 15, 1945—Closing date for advertising copy December 20, 1944

Circulation — includes all subscribers of TELEPHONE ENGINEER & MANAGEMENT—Purchasing departments of U. S. Signal Corps, Purchasing Agents of Foreign Governments ***plus*** **EVERY telephone company in the Central and South Americas** . . . . . .

TELEPHONE COMPANIES *of the* CENTRAL and SOUTH AMERICAS *now look to* North American Manufacturers to supply their needs.

★

With a ready market for available products—***plus***

A TWO BILLION DOLLAR

POST WAR MARKET (estimated expenditures to rehabilitate telephone plants after the war) MANUFACTURERS and SUPPLIERS serving this huge market should maintain healthy sales contacts.

The 1945 TELEPHONE "BLUE BOOK" & BUYERS' GUIDE will be mailed to every telephone company in these countries.

Send space reservations to

TELEPHONE ENGINEER & MANAGEMENT, 7720 SHERIDAN ROAD, CHICAGO

Conventioners: rear L to R—Eva Wise, Mrs. Miller, 2nd row—Mildred Eddins, Mary Callis, Dorothy Lambert, Mrs. G. Fred Switzer. 1st row—Lucille Wimer, Naomi Fries, Mary Ann Bradshaw, and Lucille Shoemaker.

Borden throughout the year, also the work of the legislative committee, composed of Rodney Coggins, G. Fred Switzer, and Stanley Owens.

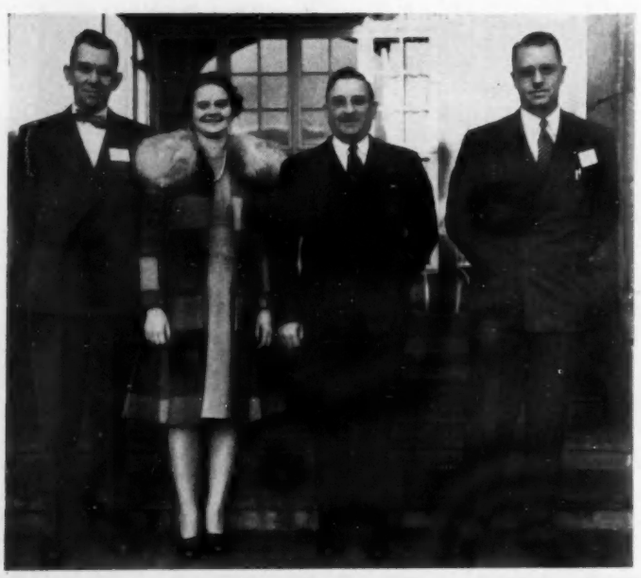
Stanley Owens then presented recommended ammendments to Article 8 of the association by-laws, which were passed upon by the members.

Dr. Cocke, chairman of the nominating committee presented the following names as members of the board of directors of the association: F. G. LaPrade, 1945-47; Frank A. Gould, 1945-47; W. C. Darrow, 1945-46; Fred Prufer, 1945-46; J. P. Borden, 1945, and E. B. Fitzgerald, 1945, all of whom were elected to serve for the terms shown above.

An innovation at this convention was "Hospitality Hour", which was well attended and enjoyed. The purpose of this hour was for all of the members and suppliers to get together and meet and talk with each other. The committee, Rodney Coggins and A. W. Schell, chairmen; W. E. James, A. C. Stratton, G. Fred Switzer, and Frank LaPrade, is to be congratulated on the successful outcome of "Hospitality Hour".

On Friday morning the members of the association were privileged to witness "The Dramatization of Traffic Troubles and a Solution" written and produced by W. C. Darrow, Tarboro, N. C. This was the same production which was so successfully shown at the United States Independent Telephone Association in Chicago.

During the afternoon session Judge Robert O. Norris, of the Virginia State Corporation Commission addressed the gathering on "Post War Planning", in which he said,



Attending the Virginia convention were: Frank Haven, Carolina Tel. & Tel. Co., Tarboro, N. C.; Joanne Fearzell, Intermountain Telephone Co., Bristol, Tenn., W. C. Darrow and George Rose, also of Carolina Tel. & Tel., Tarboro, N. C.

"We must, of course, make every sacrifice to take back into civilian work the boys as they come out of the army and the navy. There must be no veterans walking the streets, seeking work, and we must leave no stone unturned to prove to them our gratitude for the patriotic service they have rendered their country."

Following Judge Norris, John E. Sexton, general auditor of the Inter-Mountain Telephone Company, Bristol, Tenn., gave an interesting talk on "Taxes". Mr. Sexton said: "We as taxpayers should be more prone to discuss the tax problems with our representatives.

"It is gratifying to note that the elimination of double-taxation of dividends is now being discussed. This would mean that corporations would be taxed only on their undistributed profits. It would encourage the buying of stocks, and management would tend to replace their bonds with stocks. It would stimulate the investment banking business, as corporations would tend to do their additional financing by offering stock. The growing practice of dissolving corporations to form partnerships in order to avoid excessive taxes would be reversed.

"Within the past few months an alarming piece of legislation has been enacted in one of our largest cities. It is the gross receipts tax levied on utilities in order to obtain a franchise. The governing body in that state went so far as to maintain that this tax for the privilege of doing business would be charged against surplus and not as a business expense, and further, would not come out of the taxpayers' pockets. Surely the American people are not so gullible that they can expect a corporation to remain in business without giving the stockholder some return on his money.

"This can lead to only one conclusion, that a margin for profit must be maintained, and the public makes this possible whether it is direct, or indirect, through government subsidy.

"We as individuals and operators of telephone properties should not only expect but demand the same economy in government, as is expected in business.

"The theory 'that excess-profits taxes takes profits out of war' is far from true in an industry such as we represent. They also drain off much needed funds that we will need for deferred maintenance once WPB restrictions are lifted. In other words, our profits are over-stated to the extent that we have had to postpone our usual maintenance program through lack of manpower and material."

James P. Borden of the Virginia Tel. & Tel. Co., Charlottesville was named president of the Virginia Association.

The subject of the address given by John Shaw, assistant vice-president of the American Telephone & Telegraph, New York City, was "Public Relations".

The climax of the convention came with the banquet, floor show, and dance, which were well attended and greatly enjoyed. Mr. McNish acted as master of ceremonies, introducing the new officers and directors of the association, which are as follows:

J. P. Borden: president; W. J. Holloway: 1st vice-president; Lloyd C. Pulley: 2nd vice-president; Stanley Owens: secretary-treasurer, and Elizabeth Dull: asst. secretary-treasurer.

New directors are: W. C. Darrow, Fred Prufer, Frank Gould, E. B. Fitzgerald, Frank G. LaPrade, G. R. Gish and Kelley McNish.

Iowans Organize District Group

The northeastern Iowa Telephone Group has been formed and will hold meetings at least every three months according to an announcement made during October. C. C. Pearce, manager of the Farmers Telephone Co., Riceville, has been named president of the group and Floyd Hobbs, manager of the Butler-Bremer Telephone Co., Plainfield has been selected as vice president. Waldo Piehn, manager of the Piehn Telephone Co., Alta Vista, is the secretary-treasurer.

In the announcement it was recalled that a district meeting was held in New Hampton by the Iowa Independent Telephone Association during September. A total of 21 telephone men from northeastern Iowa attended and following the meeting decided to organize for quarterly meetings. Potential plans now include a meeting at Castalia on December 7 and the program is now being arranged. The group will cooperate in every way with the Iowa Independent Telephone Association.

Accompanying the announcement was a questionaire asking for information and suggestions as to subjects the group wants discussed. Many subjects are listed, under the headings of Rural Line Construction and Maintenance, Cable Plant, Central Office Equipment and Commercial.

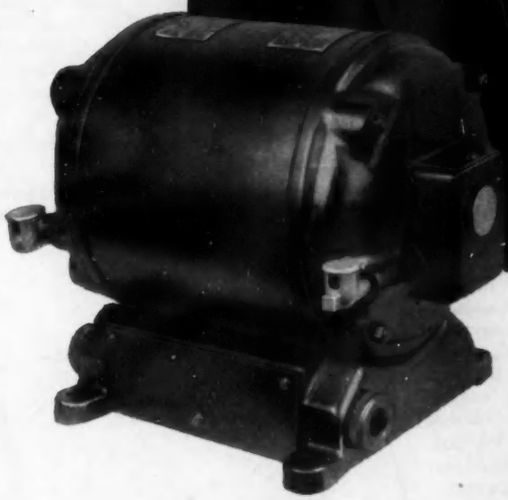
Traffic Department Holds Dinner

The traffic department of the Middle States Telephone Company of Illinois held a get-together recently at the Illinois Hotel in Pekin.

Those attending were Mary Briggs, Doris Cullinan, Lois Gardner, Alice Gill, Lois Harrison, Mary Hornback, Ruth Johnson, Marcia Mann, Alice Oltman, Marjorie Pettit, Kathryn Puterbaugh, Kathryn Ricketts, Leola Ripper, Norma Simpson, Nellie Skaggs, June Rebman and Evelyn Westrope.

For Long
Trouble-Free Service
Use
HOLTZER-CABOT

MAGNETO RINGING SETS



- **Only ONE rotating element assures long life.**
- **No brushes, collector rings or motor cutout.**
- **Does not cause radio interference.**

Designed and engineered for exchanges up to 1,500 subscribers, this Holtzer-Cabot Magneto Ringing Set provides a complete solution for ringing requirements. Its simplicity of design . . . only one rotating element . . . assures long operating life with little if any maintenance cost. It operates quietly and causes no radio interference. Close voltage regulation assures uniform ringing. Output is 80 volts, 19 cycles, 15 watts. The Holtzer-Cabot line consists of a complete range of types and sizes of equipment to meet all ringing requirements. It has the unqualified approval of the engineering and service departments of all major telephone companies. Bulletin 1310-02 gives the complete Holtzer-Cabot story. Write for your copy today.

HOLTZER-CABOT
Division of First Industrial Corporation
Designers and Builders of Special Fractional HP Motors and Electrical Apparatus

125 AMORY ST., BOSTON 19, MASS. 6161 SO. STATE ST., CHICAGO 21

How About Your Equipment for the "Post-V-Day" New Construction?

THE *American* COACH

REPLACEMENT PLAN

Will Help You Solve That Problem Most Satisfactorily

AN analysis of data, secured by personal contact with utility executives shows that many additional trucks will be needed for the construction and maintenance of the lines required to service the thousands of new homes planned for the immediate postwar period.

Anticipated requirements are far in excess of any peacetime demands and utility body manufacturing capacity will be taxed to the limit to produce *"enough on time"*.

THE AMERICAN COACH REPLACEMENT PLAN is set up to speed the production and delivery to Utilities of the needed line trucks, meter and telephone installers trucks and all types of service equipment at the earliest possible date after "V-Day".

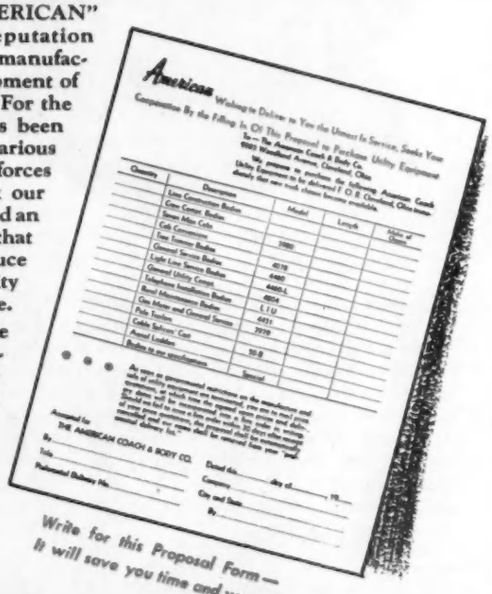
The basic idea of the plan is to set up your utility body needs in a master production program that will be set in motion on the day that government restrictions on manufacturing are terminated.

The bodies of those participating in the plan will then be produced and held in our factory, ready for mounting on the truck chassis the moment they arrive.

Participation in this plan does not place you under any obligation, for should your own plans change, all or part of the bodies built for you will be assigned to the next purchaser on the preferential delivery list.

For a long period of years "AMERICAN" has enjoyed an outstanding reputation among the Public Utilities for the manufacture of Utility Bodies and Equipment of soundest design and engineering. For the past war years "AMERICAN" has been working at top speed making various types of equipment for the armed forces of the government. In this work our engineers and designers have gained an added knowledge and experience that will enable "AMERICAN" to produce even more highly efficient Utility Bodies and equipment than before.

It will certainly pay you to get the full details of this plan that will assure you early delivery of the Utility bodies, winches, power take-offs and other equipment that will be needed so badly to replace and augment your present hard pressed and hard worked equipment. Write today.



Write for this Proposal Form — It will save you time and worry.

BUY MORE WAR BONDS

THE *American* COACH & BODY CO.

WOODLAND AVE. AT E. 93rd ST., CLEVELAND 4, OHIO

PUBLIC UTILITIES EQUIPMENT FOR MOTOR VEHICLES

Highlights of the Communications News

(Continued from page 48)

ices and for isolated rural telephony. Mr. Chaney's statement read that "the telephone industry is alert to these developments" and it must be ready to aid in their progress and to put into use such developments when their commercial values become known and upon public demand.

"As and when individual telephone companies are assigned frequencies for the various services to be rendered the public", Mr. Chaney's statement continued, "the telephone companies should, in my opinion, be prepared to make such services available to the public as rapidly as it becomes practicable. It is difficult, at this early date, to predetermine when it will become practicable, as experimental work must be carried on, costs will have to be reduced. Undoubtedly, in making the various services available to the public, it will be on a limited scale in the beginning and from that point on the service will, no doubt, be expanded".

Election Produces Changes

THE election results are to produce three changes in the membership of the Senate Interstate Commerce Committee, and four Representatives on the House Interstate Commerce Committee in the new, 79th Congress. These two committees handle the legislation affecting the communications-radio industries and the FCC.

On the Senate Committee only democrats were affected by the election. On the House Committee there were three Democrats who will be off that body in the 79th Congress and one Republican.

Sinking Poles By Explosive

To sink poles in very loose sand where the ordinary method of using an earth augur is withdrawn, the U. S. Army Signal Corps has developed a new method that uses an explosive to blast a hole to any desired depth. The pole is poised in such a way that it sinks instantly into the hole like a stone dropped into a well. Within a

split second of the touching off of the charge the pole is firmly planted in the sand at a depth of five to ten feet, depending upon the force of the explosive used.

There are five steps to the operation, as follows:

1. A camouflet tube, which is a mine so charged that its detonation dislodges the earth or matter immediately adjacent to it rather than merely blasting a surface crater, is driven down into the sand, say to a depth of five feet.

2. A primer and 2 pounds of explosive (in the form of cartridges threaded on cortex) are inserted in the tube.

3. The tube is then withdrawn, and the loose sand falls in on the explosive charge, filling the hole completely, as though no operation had been undertaken.

4. The pole is then placed upright on the ground directly over the charge and is held in position by four light guy ropes.

5. The charge is fired, and immediately the pole sinks to a depth of between five and six feet, where it remains firmly embedded, the loose sand falling in around it as packing.

If two and a half pounds of explosives are used, together with two primers, the same operation will sink the pole to a depth of ten feet.

George Mussman Buys Exchange

The De Motte and Roselawn Telephone Company of Indiana has been purchased by George Mussman, manager of the Hebron, Ind. Telephone Company. Mr. Charles Summers, the former owner, operated the plant for eighteen years and has planned to retire from telephone life and manage his farming interests.

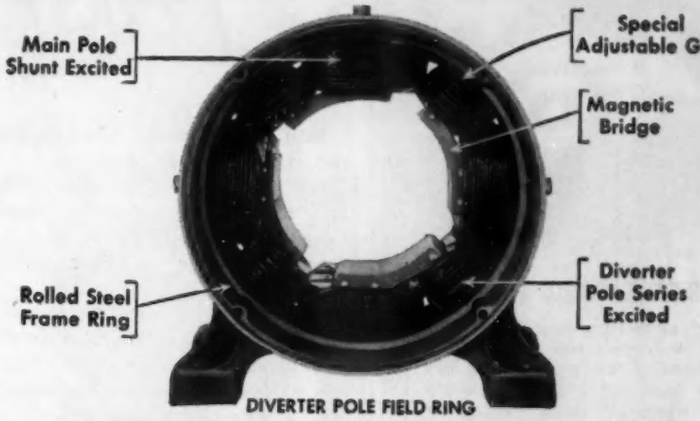
United Telephone Buys Fortescue

United Telephone Company of Mound City, Mo. has bought the Farmers Mutual Telephone Company of Fortescue.

An executive of the United Telephone Company states that the physical property of the Fortescue plant has been allowed to go down to such a state that, as soon as labor and materials are available the property will be virtually renewed.

Applications have been approved by the WPB in Washington for the purchase of the necessary materials to bring the Fortescue telephone lines up to first class condition.

WHAT IS GOOD BATTERY CHARGING?



Your Answer Is Found in the DIVERTER POLE MOTOR-GENERATOR

What Is Required of The Ideal Telephone Exchange Charger	What the DIVERTER POLE MOTOR-GENERATOR Provides
A Must control the exchange voltage well within high-low limits at *all* times.	A The Diverter Pole provides this by the compounding action of the magnetic bridge and the effect of the Diverter Pole Field.
B Must provide a closely regulated charging rate, enough to compensate for losses and maintain the battery in a healthy fully charged condition.	B A closely controlled charging rate is dependent on a constant charging voltage at all times, which is an inherent feature of the Diverter Pole generator.
C Must be fully automatic in operation requiring only periodic inspection.	C Automatic operation is dependent on the inherent characteristics of the charger which will repeat exactly, indefinitely. This is fundamentally characteristic of the Diverter Pole generator.
D Must be dependable to the extreme.	D Dependability is primarily a function of mechanical and electrical design. The Diverter Pole Generator is unusually conservative as evidenced by a very low temperature rise and all manufacturing operations are most carefully inspected and tested to meet the highest standards.
E Must reduce to a minimum transmission of any noises to the circuits and must be mechanically quiet.	E The Diverter Pole provides this mechanically by design requiring only a gentle motion of air for adequate cooling—electrically by a knowledge of the design factors controlling electrical circuit noises.
F Must be inherently protected from any damage or variation of characteristics in the event of a discharge of the battery through the generator.	F The Diverter Pole principle eliminating a compounding field permits armature current flow in the reverse direction without change of magnetic polarities. With the Diverter Pole principle, protection from severe overloading is secured by a drop in voltage to relieve and protect the Motor-Generator.

Send for Bulletin No. 96 For Complete Details—

The Electric Products Co.
1739 CLARKSTONE ROAD · CLEVELAND 12, OHIO

REMEMBER IT?

A war casualty: Twinply underground wire has not been available through the past two years but we look for big stocks early in reconversion days. Plan on using twinply in your postwar construction.

★ ★ ★ ★

ONE OF THE SPECIALLY DEVELOPED PRODUCTS BROUGHT TO YOU FIRST BY SUTTLE

DEPEND ON SUTTLE

PENTA POLES

NAUGLE

FULL LENGTH TREATED

NONE BETTER FOR LASTING SERVICE

Many extra years of trouble-free service are added to the already unexcelled long life of natural Northern White Cedar Poles by the Penta full length treatment. NAUGLE, for over 60 years a well known supplier to the telephone field stakes its reputation on EVERY claim made for PENTA Poles.

★

Penta means a full length treated Northern White Cedar Pole. Treatment is from butt to top in highly chlorinated phenol solution.

We will be pleased to quote you on your next order.

NAUGLE POLE and TIE CORP.

Western & Northern Cedar Poles

317 Plymouth Bldg., Minneapolis

Personalities

John T. Detchon, New Richmond, Ind., was named as agent for the Coal Creek Telephone Corporation, Attica; and the Wabash Prairie Telephone Corporation, Attica, according to news reports on new corporations formed in Indiana.

●

W. Burton Saunders, vice president and general manager of the Indiana Associated Telephone Corporation, Lafayette, has been named vice-chairman of the United War and Community War Funds for 1945 in his county.

●

Leon F. Roberts, commercial superintendent of the Jamestown (N. Y.) Telephone Corporation and active on the USITA Advertising Committee, was principal speaker at a recent Rotary Club meeting in Jamestown. **Mr. Roberts** is well known as a speaker in New York state and has the opportunity of bringing the problems of the telephone companies direct to the user.

●

Frank Shaffer is the new manager of the Eureka (Ind.) Telephone Company having succeeded **George Miller,** manager for the past four years.

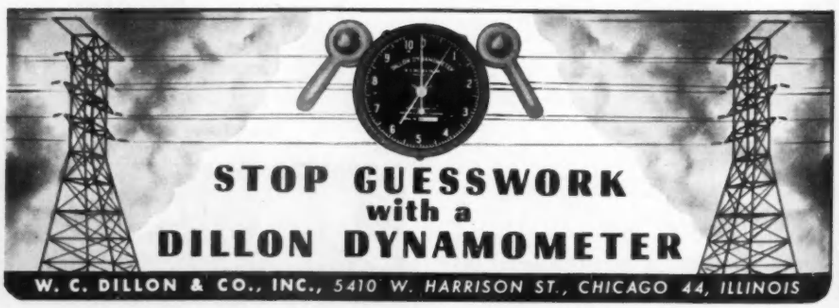
●

Kelley McNish, president of the Inter-Mountain Telephone Co., Bristol, Tenn., was host at a dinner recently in the Hotel General Shelby, Nashville, in honor of **J. A. Bethune,** Nashville, and the group of Inter-Mountain men who attended a two-week class on test-room transmission work. **Mr. Bethune** was the instructor. Those attending from Inter-Mountain were: **H. G. Bruce,** Kingsport; **F. T. Carrier, Jr.,** Kingsport; **G. E. Creger,** Johnson City; **L. G. Turney** and **Roy Slemp,** Bristol.

H. W. "Hube" Hubenthal, secretary of the Oklahoma Telephone Association, is really active in getting a large attendance at the coming annual convention of that group at the Huckins Hotel, Oklahoma City, November 27 and 28. He is welcoming all telephone men—members or non-members.

●

C. C. "Clif" Pearce, manager of the Farmers Telephone Company, Riceville, Iowa, and prominent in affairs of the Iowa Independent Telephone Association, has written the Editor notifying us of the newly organized Northeastern Iowa Telephone Group that was formed following a district meeting by the Iowa association at New Hampton. Clif Pearce is president of the new group, **Floyd Hobbs,** Plainfield, is vice president and **Wald Piehn,** Alta Vista, is secretary-treasurer.



Charles F. Mason, the retiring president of the United States Independent Telephone Association and president of the Associated Telephone Co., Ltd., Santa Monica, was widely quoted by the press on his address to the USITA in the October convention. Press clippings from New York to Montana and from Florida to Maine have been received. His entire address was carried in the October 15 issue of TELEPHONE ENGINEER & MANAGEMENT.

•

Roland C. Davies, our Washington correspondent and Editor of "Telecommunications Reports" is covering news on all fronts these days. He attended the USITA Convention in Chicago last month. As we go to press with this issue we have his report from Washington and material from the NARUC convention in Omaha, Nebr., where he is attending all sessions.

•

George C. Richert, a member of the WPB Communications Division staff, was recently appointed Telephone Engineer of the Public Utilities Division of the Treasury Procurement Division which is headed by **David Kosh.** Mr. Richert will be in charge of contractual relationships of the telephone companies with the Federal government and all telephone rate and equipment studies.

•

Brigadier General Terence J. Tully, former Chief Signal Officer of the Fifth Army in Italy and former Corps Signal Officer in the North African Theatre of Operations, this week was designated Chief of the Distribution Division under **Major General William H. Harrison,** Director of the Signal Corps' Procurement and Distribution Service.

•

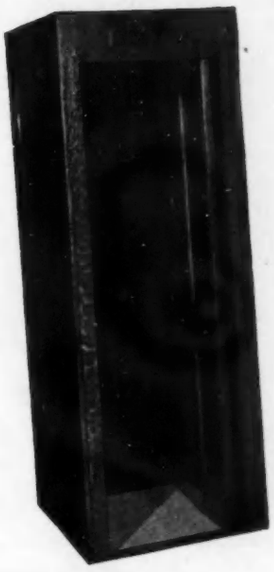
Hal McNaughton, advertising manager of the Indiana Steel & Wire Co., Muncie, Ind., forwarded us a clipping that appeared in a recent issue of the "Muncie Press' calling attention to unequal burdens placed on small telephone companies. In our December issue of "Fortnightly TELEPHONE ENGINEER" we will start a Farm Telephone Forum and are inviting our readers to join in the discussion.

•

Robert C. Hummel, technical advisor, is the author of an interesting series of technical articles now running in "Crosstalk", the magazine of the West Coast Telephone Company, Everett, Wash. Each issue of this interesting little magazine carries a section authored by Mr. Hummel.

STROMBERG-CARLSON
RECOMMENDS—

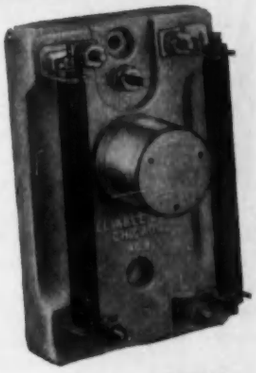
REPEAT CUSTOMERS Are Satisfied



The **CHURCHILL**

No. 100 Folding Door TELEPHONE BOOTH

Booth provides comfort and privacy for your customers. You will find them repeatedly returning to use your **CHURCHILL** Booth and increase pay station business.
It is constructed as a single unit and equipped with a reinforced back panel for mounting a wall telephone or coin collector.
The **CHURCHILL** Booth is made of selected white oak and is available in light or medium oak in a satin finish.
Included as standard equipment are electric light and automatic electric ventilator.
Overall height is 84¾"; width, 29"; depth, 30½". Shipped knocked down and crated.
Illustrated literature available.



No. 955 STATION PROTECTORS

Listed as Standard by the Underwriters' Laboratories

The Reliable No. 955 INDIVIDUAL STATION PROTECTOR has all the features of the well-known line of RELIABLE PROTECTORS which have made them the standard of independent operating companies and railroads. This protector is of one piece design which simplifies mounting and eliminates any need for asbestos mats. The protector is neat and compact with connections easily accessible.
Made with special, low absorption porcelain base, phosphor bronze fuse clips and discharge block springs, and heavy binding posts with studs treated to prevent season cracking.
Equipped with Reliable self-cleaning sawtooth discharge blocks and carbons which drain minor static discharges without leaving a ground on the line.
The No. 955 is equipped with two No. 55 seven ampere fuses.
The No. 955-A has clips which bite into the fuse tips and is equipped with two No. 77 seven ampere fuses.
Other fuse capacities are supplied on these protectors when specified.

"RELIABLE" IDENTIFIES THE QUALITY

STROMBERG PROGRESS IN TELEPHONY CARLSON

STROMBERG-CARLSON COMPANY

Factory and General Offices: Rochester 3, New York, U. S. A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

Text of Amended WPB Orders U-2, U-3 and U-5

(Continued from page 39)

(5) Subject to the provisions of (c) (4) (ii) and (c) (4) (iii) above, operators shall regrade existing service to the extent necessary to provide service authorized by the War Production Board because of unreasonable hardship.

(d) **Limitations on additional telephones.** (1) Main stations. Operators shall limit the number of main telephone stations, including P. B. X. trunks, connected to any central office to 105% of the number the central office was designed to serve under prewar engineering and operating practices. This provision has the following exclusions and exceptions:

(i) Main stations do not include extensions or P. B. X. stations.

(ii) If the number of main stations connected to a central office on March 25, 1943 exceeded the 105% limit, the number need not be reduced so long as service is satisfactory.

(iii) The 105% limitation need not be applied to a single-office exchange which is designed to serve less than 1,000 main stations.

(iv) The War Production Board may approve a percentage other than 105% for any central office.

(2) Residence extension service. Operators shall not install or reconnect residence extension telephones, residence extension bells or residence P. B. X. telephones, nor as a substitute provide additional main lines or stations on party lines, nor install jacks and plugs for residence service. This provision has the following exclusions and exceptions.

(i) Jacks already in place may be reconnected provided that no more than one telephone and one bell shall be furnished with the telephone line with which the jacks are associated.

PONCE DE LEON
would have started the first "bridge of ships" across the Atlantic if he could have phoned the oldsters of Europe when he discovered the Fountain of Youth.
Long Life DROP WIRE
The "Know how" of nearly 50 years is in the construction of LongLife Drop Wire. It gives the assurance of long, satisfactory performance, so important to your maintenance department.
Distributed by GraybaR
WB
THE WHITNEY BLAKE CO.
New Haven, Conn.
Well Built wires since 1899

(ii) Temporary installations of one residence extension may be made when the operator finds it essential in cases of serious illness.

(iii) For practicing physicians and surgeons, the following services may be provided, but the operator shall supply the minimum which will meet professional requirements. The operator may install two jacks and make the main station telephone a portable telephone, or, as an alternative, install one extension telephone or, as an alternative, install two jacks for use with a single portable extension telephone. The operator may also provide a connection with an answering bureau.

(iv) The installation and reconnection in residence quarters of telephones connected to private branch exchanges serving hotels, apartment houses, etc., may be made to the extent that no more than one such telephone may be provided in any residence quarters.

(e) [Revoked July 17, 1944.]

(f) **Limitation on replacements. Operators shall not make replacements of P. B. X. systems with dial equipment.**

(g) [Revoked Oct. 30, 1944.]

(h) **Non-applicability to certain replacements and additions.** (1) The terms of this order shall not prohibit wire communications projects approved by the War Production Board on form WPB-2774 or other appropriate form.

(2) Nor do they prohibit the completion of a project the physical installation of which was started at a time when the project was permitted by Order L-50 or an earlier issue of Order U-2.

(i) [Revoked July 17, 1944.]

(j) **Exemption of armed forces.** The restrictions of paragraphs (b) (3) and (f) shall not apply to facilities for the official use of the armed forces or the Veterans' Administration.

(k) **Engineering and planning.**. All operators shall engineer all replacements or additions to central office equipment so as to limit the margin for expected growth of requirements to a period not in excess of one and one-half years.

(l) **Reports.** All operators affected by this order shall execute and file with the Office of War Utilities such reports as the Director, Office of War Utilities, shall from time to time require; subject to the approval of the Bureau of the Budget pursuant to the Federal Reports Act of 1942.

(m) [Revoked Jan. 20, 1944.]

(n) Appeals and applications. Appeals or applications for relief from paragraphs (b) (3) and (f), involving

the installation of dial P. B. X. equipment and dial private intercommunicating systems, should be submitted on Form WPB-2774. Other applications or appeals should be filed on Form WPB-2117.

(o) **Violations.** Any person who wilfully violates any provision of the order or who, in connection with this order, wilfully conceals a material fact or furnishes false information to any department or agency of the United States is guilty of a crime, and upon conviction may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control, and may be deprived of priorities assistance.

(p) **Communications.** All reports required to be filed hereunder, and all communications concerning this order, shall, unless otherwise directed, be addressed to: Communications Division, Office of War Utilities, War Production Board, Washington 25, D. C., Ref.: U-2.

Issued this 30th day of October, 1944.

War Production Board,
By J. Joseph Whelan,
Recording Secretary.

Schedule A — Categories To Be Accorded Preference in Obtaining Service to the Extent Required for the Proper Discharge of Duties in Direct Defense, Public Health, Welfare and Security.

1. **Armed forces and government.** (a) Official Army, Navy, Marine Corps and Coast Guard Units and the Veterans' Administration. Office of Civilian Defense Units.

(b) Official Federal, State, county, and municipal government services.

(c) Official agencies of foreign governments.

2. **War production and directly related activities.** (a) Business concerns furnishing material equipment or facilities under prime or subcontracts to the Armed Forces of the United States (or their suppliers). Petroleum operators for their oil or gas producing or drilling operations. The business offices of persons who regularly perform special services for these business concerns, such as consulting engineers, chemists, lawyers, and accountants. The business offices of persons rendering special service in connection with construction of defense projects authorized by the War Production Board, such as contractors, engineers, and architects. Labor unions having bona fide collective bargaining agreements with business concerns identified in this Schedule A.

(b) Public transportation, pipe line

STROMBERG-CARLSON
RECOMMENDS—

T. J. MOSS TIE COMPANY
(Founded 1879)

MC
"The Stamp of Character"

POLES

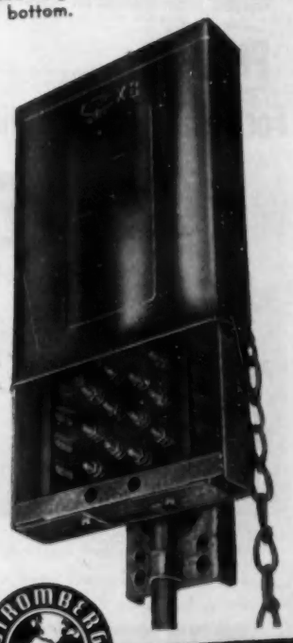
CREOSOTED SOUTHERN YELLOW PINE POLES

Produced, seasoned and treated under careful supervision of people that have pioneered in the selection and treatment of highest quality forest products.

Saves
Through Longer Service and Smaller Installation Cost

COOK XB CABLE TERMINAL
(Unprotected)

Available in 6 to 26 pair sizes, the Cook XB Unprotected Cable Terminal offers many important features:
Patent metal guards exclude snow, rain, dirt, and insects at the drop wire openings.
The patented plastic faceplate and insulated fanning strip are molded in one piece.
Raised stud mountings eliminate surface leakage.
Patented cable entrance and cable holding sleeve provide secure and tight cable joint.
The compound is completely filled by an exclusive moisture-proofing process that insures against shorts and grounds by permanently positioning the cable pairs. Heavy reversible zinc hood permits mounting with stub from either top or bottom.



STROMBERG-CARLSON COMPANY
Factory and General Offices: Rochester 3, New York, U. S. A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

companies, all types of public utilities.

((c) Business concerns who regularly maintain or service equipment essential to the Armed Forces, war production, public transportation public utilities, and pipe line companies.

3. **Public health and welfare.** (a) Public or private organizations directly serving the public safety, health or welfare, such as: hospitals, clinics, sanitoria; physicians, surgeons, dentists, nurses, nurses' registries, veterinarians, ambulance services, manufacturers or distributors (wholesale and retail) of drugs, surgical, medical, hospital or dental supplies or equipment; mortuaries, burial service organizations; the American Red Cross and similar agencies.

(b) Philanthropic and eleemosynary organizations recognized as such by the Bureau of Internal Revenue, including their fund-raising offices; United Service Organizations and other similar organizations; religious establishments and their officiating clergy; Christian Science Practitioners; public and private schools.

(c) Press associations, newspapers, radio broadcasting stations.

(d) The business or management offices of new housing developments.

(e) Food processing; food distribution (wholesale and retail) and food storage organizations and producers of substantial quantities of food.

Schedule B

Categories to be accorded preference in obtaining service in the order provided in paragraph (c) (2).

1. Residence service where the attending physician or surgeon certifies in substantially the form set forth in the Schedule B Certification Form (WPBI-2101) that there exists a condition of serious illness or pregnancy involving serious complications, that he must be called repeatedly at unpredictable intervals for emergency treatment and that in view of all the circumstances telephone service is essential. Such service shall be terminated within 30 days of the termination of the conditions specified above.

2. Residence service required where a person lives alone and the attending physician certifies in substantially the form set forth in the Schedule B Certification Form (WPBI-2101) that such person is confined to residence quarters for a protracted period by reason of serious illness or physical disability and that in view of all the circumstances telephone service is essential. The phrase "lives alone" includes a person who is alone all day or during the day or night working hours, except for one or more children aged ten years or younger or another person similarly certified to be confined to residence quarters by reason of serious illness or physical disability. Such service shall be terminated within 30 days after the termination of the conditions specified above.

Schedule C

Categories to be accorded preference in obtaining service in the order provided in paragraph (c) (2).

1. Residence service for the wife of a member of the armed forces who is on active duty away from home, where her household consists only of herself and one or more children aged ten years or younger. The applicant for service must certify to these facts in substantially the form set forth in the Schedule C Certification Form (WPBI-2102).

2. Residence service for those who discontinued residence service upon entering the armed forces of the United States and who apply within six months after being honorably separated from the armed forces, for residence service within the area indicated in paragraph (c) (2) (iii). The applicant for service must certify to these facts in substantially the form set forth in the Schedule C Certification Form (WPBI-2102).

Text of U-3 War Production Board

PART 4501—COMMUNICATIONS

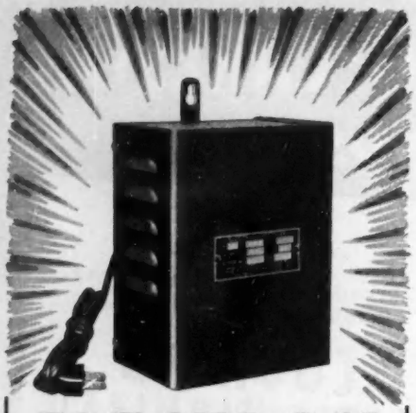
[Utilities Order U-3 as Amended Oct. 30, 1944]

Preference Rating Order (MRO) for Telephone Industry

(a) Definitions.

(b) CMP allotment symbol and preference ratings.

(c) Use of material obtained under this order.



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ELIMINATOR
GIVES WORRY-FREE SERVICE

Operates direct from lighting circuit. Delivers constant, humless D.C. to operator's circuit on magneto switchboard. Power-off relay assures uninterrupted service in case of power failure. Low in cost! See your jobber, or write direct for full information.

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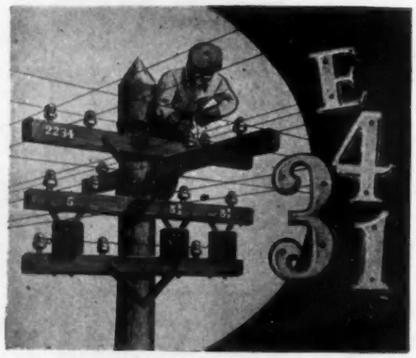
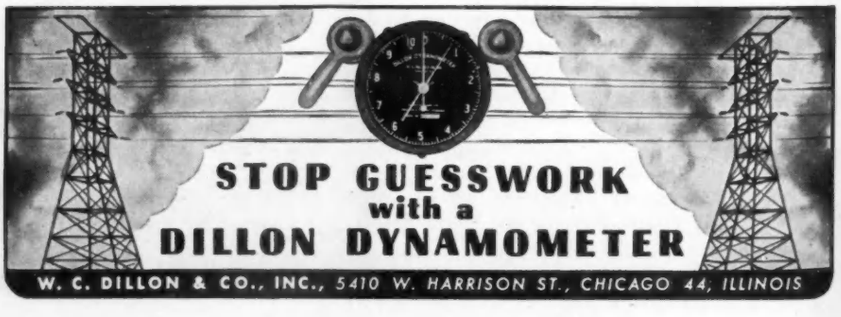
PREMAX
For Permanent Identification



When the stenciled markings on poles and other equipment have weathered away, look into Premax Stamped and Embossed Metal Letters, Figures and Pole Markers.

They'll do the job at less than stenciling cost . . . and last as long as the pole.

Premax Products
Division Chisholm-Ryder Co., Inc.
4509 Highland Ave., Niagara Falls, N. Y.



(d) Authority to begin construction.
(e) Restrictions on inventory.
(f) Restrictions on purchases.
(g) Exemptions.
(h) Sales of material.
(i) Records and reports.
(j) Applicability of regulations.
(k) Violations.
(l) Communications.

§4501.6 Utilities Order U-3—(a) **Definitions.** For the purpose of this order:

(1) "Operator" means any individual, partnership, association, business trust, corporation, receiver, or any form of enterprise whatsoever, whether incorporated or not, the United States, the District of Columbia, any state or territory of the United States, any political, corporate, administrative, or other division or agency thereof, to the extent engaged in rendering telephone communication service to the public (and such telegraph and teletypewriter service as may also be conducted by him) within, to, or from the United States, its territories, or possessions. Public law enforcement agencies and public fire protection agencies are excluded from this definition for the purposes of this order.

"Operator" also includes any persons operating a rural cooperative or mutually-owned telephone system. It further includes persons owning either a telephone or a telephone system which is connected to a telephone system rendering service to the public so long as they do not generally use an MRO order other than Order U-3. Those who generally use another MRO order for their business operations, as for example railroads using Order P-142 or a manufacturer using CMP Reg. 5 are excluded from this definition.

Note: The third undesignated paragraph of paragraph (a) (1) deleted Oct. 30, 1944.

(2) "Material" means any commodity, equipment, accessory, part, assembly or product of any kind.

(3) Without regard to accounting practices:

(i) "Maintenance" means the minimum upkeep necessary to continue a facility in sound working condition.

(ii) "Repair" means the restoration of a facility to sound working condition when the same has been rendered unsafe or unfit for service by wear and tear, damage, failure of parts or the like.

(iii) Neither maintenance nor repair shall include the improvement of any plant, facility or equipment, by replacing material which is still usable with material of a better kind, quality or design.

STROMBERG-CARLSON
RECOMMENDS—

"DEPENDABLE"
CROSS ARMS
Are Made by
American Cross-Arm, Inc.

They are available in:
★ Douglas Fir
★ Creosoted Yellow Pine
★ Gulf-Red Cypress

The best quality cross-arms you can buy.

Always well-seasoned, these cross-arms are proving their sturdiness and dependability under the most severe conditions.

Available for prompt shipment.

HABIRSHAW

No. 17 Bronze Drop Wire

Distributed Exclusively by
STROMBERG-CARLSON

High strength bronze conductor . . . expertly blended synthetic rubber insulation . . . soft, unbleached cotton braid, thoroughly saturated to provide a long-lived moisture-resisting covering.

A Quality Product Made by
Phelps Dodge Copper Products Corporation

Habirshaw Cable and Wire Division

STROMBERG-CARLSON COMPANY
Factory and General Offices: Rochester 3, New York, U. S. A.
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(4) "Operating supplies" means any material essential to the operator's business and used for purposes other than maintenance and repair.

(5) Without regard to accounting practices, "operator's inventory" means the aggregate of material currently owned by an operator and not incorporated into plant or in the process of being consumed, exclusive of:

(i) At the operator's option, the dollar value of material offered for sale and listed by categories in column (b) of Form WPB-1127 in each quarter; except that the dollar value so reported may not exceed the dollar value by categories of matherial reported in column (b) of Form WPB-1127 for the second quarter of 1944.

(ii) Material for use on a project approved by the War Production Board **on form WPB-2774 or any alternative form.**

(iii)]Revoked Oct. 30, 1943.[

(iv) [Revoked Oct. 30, 1944.]

(v) [Revoked Oct. 30, 1944.]

(vi) Poles, crossarms, insulators and non-metallic conduit, furniture and fixtures; office machinery, printing, stationery and office supplies; house service supplies; and coal and petroleum products.

(b) **CMP allotment symbol and preference ratings. (1) An operator is authorized to use the CMP allotment symbol U-9 and is assigned the preference rating of AA-1 for deliveries of material for maintenance, repair and operating supplies, except that:**

(i) AA-1 shall not be used to obtain telephone sets; and

(ii) AA-1 shall not be used to obtain material for any construcion job involving more than $2,500 of material obtained under this order.

(2) An operator is assigned the preference rating of AA-3 for deliveries of material for any construction job involving more than $2500 and not to exceed $10,000 of material obtained under this order.

(3) An operator is assigned the preference rating of AA-3 for deliveries of telephone sets.

Note: Paragraphs (4) and (5) formerly paragraphs (2) and (3) redesignated Oct. 30, 1944.

(4) An operator may apply and a supplier may extend the **CMP allotment symbol or rating** in the manner provided in Priorities Regulation 3 and CMP Regulation 3, by placing on his delivery order substantially the certification set forth below in paragraph (b) (5).

(5) Utilities maintenance, repair and operating supplies certification.

CMP allotment symbol U-9, preference rating ------. The undersigned operator certifies, subject to the penalties of section 35A of the United States Criminal Code, to the seller and to the War Production Board, that, to the best of his knowledge and belief, the undersigned is authorized under applicable War Production Board regulations or orders and under all provisions of Utilities Orders U-2, U-3, and U-6, to place this delivery order, to receive the item(s) ordered for the purpose for which ordered and to use any **CMP allotment symbol or rating** which the undersigned has placed on this order.

(c) Use of material obtained under this order.

(1) Material obtained under this order may be used, in an amount costwithin the limitations of Orders U-2 and U-6.

(2) Material obtained under this order may be used, in an amount costing not more than $50, on any con-

Telephone Engineer

HANDBOOK TABLES

Tree Trimming Data—Characteristics of Tree Species (Cont.)

Index—Outside Plant Maintenance
Date—November 15, 1944

Species (Common Name)	Avg. Annual Terminal Growth* Rate in Ft.	Approx. Mature Height in Ft.	Comparative Wood Strength Values (Green)† Lb. per Sq. In.	Suggestions
Spreading Growth Form				
Basswood	1.50	75	5,000	Soft, weak wood. Overbuild.
Beech (American)	1.85	60	8,600	Does not stand severe topping. Side or under trim.
Birch (White)	1.80	50	6,400	Does not top. Avoid or trim lightly.
Buckeye (Horse Chestnut)	1.00	60	4,800	Top or side trim. Soft, weak wood.
Cherry (Black)	1.00	60	8,000	Do not top heavily. Underbuild old trees.
Hackberry	1.00	50	6,500	Top, or side trim on older trees.
Locust (Black)‡	1.30	60	13,800	Vigorous sucker growth when topped. Side or under trim old trees.
Maple (Red)	1.50	75	7,700	Top or side trim. Underbuild old trees.
Maple (Sugar)	1.50	75	9,400	Do not top old trees too heavily.
Oak (Live)	1.11	60	11,900	Overbuild.
Oak (Red)	1.50	75	6,900	Top, side or under trim.
Oak (White)	0.75	75	8,300	Do not top too heavily. Side or under trim.
Sycamore (Oriental)	1.80	60	Unknown	Can be topped. Vigorous sucker growth.
Walnut (Black)	1.00	80	9,500	May die back when topped heavily. Underbuild old trees.
Horizontal Growth Form				
Box Elder‡	2.15	50	Unknown	Vigorous sucker growth. Use good pole heights. Top or side trim.
Dogwood	0.30	30	8,800	Slow growing, overbuild.
Maple (Norway)	1.20	50	Unknown	Overbuild, top trim.
Osage Orange‡	1.40	45	13,700	Thorny, fast growting. Can be topped.
Willow (Black)‡	1.67	50	3,800	Brashy, fast-growing wood. Avoid if possible.

*Approximately normal average rates for Central Western States—subject to variation due to soil, moisture, and site conditions. As pruning stimulates growth, these values should be approximately tripled to arrive at first year growth rate of topped trees.
†U. S. Govt. standard test for modulus of rupture, static bending of a simple beam (Technical Bull. No. 479).
‡Remove if possible.
Data furnished by courtesy of Edison Electric Institute (Publication K-10).

In maintaining clearance of open wire lines and cable leads from tree growths, a knowledge of growth and strength characteristics and the proper method of pruning each tree species will be found helpful. An understanding of the average growth rate will help determine how much pruning a tree should receive to prevent growth contact with line conductors or cable within tree trimming cycle (usually two years). The strength characteristics of a tree species determines whether it is safe to allow the trees to grow close to or over a telephone lead, since structurally weak trees may topple over onto the line in storms or branches may break off these trees to fall on the line.

The table at the left lists the most common tree varieties found throughout much of the United States, grouped according to their general tree form; upright, spreading, and horizontal. Conifer species are not listed; since, with the exception of red and white cedar and hemlock, they do not lend themselves well to topping.

struction project permitted under this order or specifically approved by the War Production Board on Form WPB-2774 or any alternative form.

(2-a) Material obtained under this order which is in inventory may be used on any permitted construction project, even though the project is assigned a different allotment symbol or a lower rating either by this order or by the War Production Board on Form WPB-2774, or an alternative form. However, material so used may only be replaced in inventory by use of the different allotment symbol or the lower preference rating authorized by this order or by the War Production Board on WPB-2774 or alternative form.

(3) An operator, who does not furnish telephone service to the public, whose "operator's inventory" at the end of 1942 or whose use of material during 1942 did not exceed $10,000 may not, in any single case, use material obtained under this order costing more than $500 for operating supplies.

(4) No operator shall subdivide a single order, job, or project to qualify it under the dollar limitations of this Order U-3.

(5) Material obtained under this order may be used for maintenance and repair without regard to dollar limitations on the use of material for operating supplies.

(6) The dollar limits of this order shall not prevent the use of material on hand to meet temporary traffic or emergency requirements, but where the dollar limits are exceeded the material must be returned to inventory or to its original location in plant within thirty days, unless application has been made to the War Production Board for authority to continue the use of material.

(7) No material may be used for building construction or alterations if such use is restricted by Appendix I of Schedule A of CMP Regulation 6. Applications for relief from these restrictions must be filed by operators on Form WPB-2774. However, an operator may effect maintenance and repair of buildings which are essential to the conduct of the operator's business.

(8) [Revoked Oct. 30, 1944.]

(d) Authority to begin construction For any addition or expansion of telephone, telegraph or teletypewriter facilities involving a cost in material obtained under this order which exceeds $10,000, or which involves a total cost in material in excess of $25,000, an operator must obtain authority to begin construction and necessary priority assistance on Form WPB-2774.

STROMBERG-CARLSON
RECOMMENDS—

ARMSTRONG'S "Whitall Tatum" GLASS INSULATORS

107 years of glass-making experience are back of Armstrong's "Whitall Tatum" Glass Insulators—made by the Armstrong Cork Company.

Raw materials are rigidly tested . . . quality of glass is regularly checked . . . each stage of production is automatically controlled.

TOUGH!

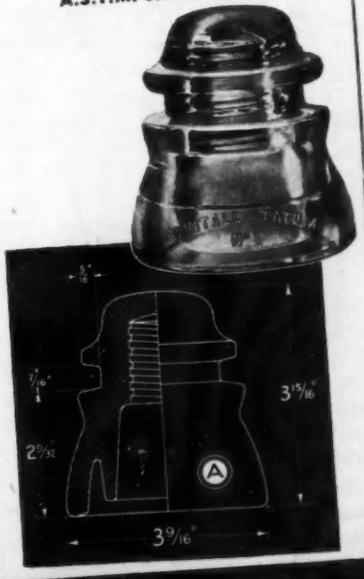
Armstrong's Glass Insulators withstand all weather conditions. In torrid heat . . . in extreme cold . . . in deluge . . . in blizzard . . . these rugged insulators have proved they can "take it".

Tests show that transverse strength exceeds that of supporting pins.

Other characteristics of Armstrong's Glass Insulators are:

Accurate dimensions
True pin fit
Crystal clarity

Conform to—or exceed—
A.S.T.M. standards



MINUTES SAVED The Job Is RIGHT!

DILLON DYNAMOMETERS accurately determine the pound pull on power, transmission, and guy strand. Direct readings save valuable time. Ordinary workmen can easily operate the

DILLON DYNAMOMETER

Specifications:

- Mechanism not injured by overload
- 1/4" shatterproof safety glass crystal
- Will withstand full shock recoil
- Large, easy-to-read numerals
- Compact (8 1/4" x 6 1/4" x 3")
- Light in weight (8 lbs. 4 oz.)
- Galvanized shackles will withstand 25,000 lbs.
- Certified Accuracy
- Readings directly in lbs.
- Low Cost.

For Years of Reliable Service, Insist on the

DILLON DYNAMOMETER

A Precision Instrument for Precision Line Testing

Accurate Dependable Rugged

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(e) **Restrictions on inventory.** (1) No operator shall accept deliveries of material unless after the delivery his operator's inventory will not exceed a practical working minimum. A practical working minimum shall in no case be greater than 27½% of the dollar value of material used during the calendar year 1940 for all purposes exclusive of the items in paragraph (a) (5) (vi) and materials which were used for building construction. The items in (a) (5) (vi) may be accepted by an operator even if his operator's inventory exceeds 27½% of his 1940 usage of material.

(2) No operator shall accept delivery of a size, type, gauge and length of cable, wire or strand, if the operator's inventory of that size, type, gauge and length is in excess of requirements for the next **ninety** days. However, if an operator needs some wire, cable or strand, this provision does not forbid purchase of the minimum standard reel-length, even though the operator does not expect to use the whole reel in the next **ninety** days.

(3) [Revoked Oct. 30, 1944.]

(4) The preference ratings assigned in this order shall not be used to obtain dial P. B. X. systems or dial private intercommunicating systems, the installation of which is prohibited by paragraph (b) (3) of Order U-2.

(f) [Revoked Oct. 30, 1944.]

(g) **Exemptions.** (1) Any operator whose operator's inventory did not exceed **$25,000** at the end of 1942 is exempt from the inventory restriction of paragraph (e) (1).

(2) [Revoked Oct. 30, 1944.]

(h) Sales of material. Material sold between operators must be sold without a preference rating of CMP allotment symbol.

(1) **Records and reports.** Each operator acquiring maintenance, repair or operating supplies pursuant to this regulation shall keep and preserve, for a period of not less than two years, accurate and complete records of all such supplies so acquired which shall, upon request be submitted to audit and inspection by duly authorized representatives of the War Production Board. In addition, each operator affected by this order shall file such reports with the Communications Division, Office of War Utilities, as may from time to time be required by the War Production Board.

(j) **Applicability of regulations.** (1) This order and all transactions affected by it, except as expressly provided, are subject to all applicable regulations of the War Production Board, as amended from time to time.

(2) None of the provisions of CMP Regulations No. 5 or 5A shall apply to operators as defined in paragraph (a) (1) of this order, and no such operator shall obtain any material under the provisions of these regulations.

(k) **Violations.** Any person who wilfully violates any provision of this order or who, in connection with this order, wilfully conceals a material fact, or furnishes false information to any department or agency of the United States is guilty of a crime, and upon conviction may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control, and may be deprived of priorities assistance.

(l) **Communications.** All reports to be filed, appeals and other communications concerning this order should be addressed to: Communications Division. Office of War Utilities, War Production Board, Washington 25, D. C. Ref.: U-3.

Issued this 30th day of October 1944.

War Production Board,
By J. Joseph Whelan,
Recording Secretary.

Text of U-5
War Production Board

PART 4501—COMMUNICATIONS

[Utilities Order U-5, as Amended Oct. 30, 1944]

Order Restricting Transfer of Wire Communication Equipment

(a) Definitions.
(b) General restrictions.
(c) Existing contracts.
(d) Applicability of regulations.
(e) Communications to War Production Board.
(f) Appeals.
(g) Violations.
(h) Reports.

The fulfillment of requirements for the defense of the United States has created a shortage in the supply of certain types of wire communication equipment for defense, for private account, and for export; and the following order is deemed necessary and appropriate in the public interest and to promote the national defense:

§4501.16 Utilities Order U-5—(a) Definitions. For the purposes of this order:

(1) "Person" means any individual, partnership, association, business trust, corporation, governmental corporation or agency, or any organized group of persons, whether incorporated or not.

(2) "Manufacturer" means any person manufacturing wire communication equipment of the kinds listed in Schedule A, to the extent that he is engaged in such manufacture, and shall include sales and distribution outlets controlled by said manufacturer.

(3) "Distributor" means any person other than a manufacturer regularly engaged in the business of leasing or selling wire communication equipment, to dealers.

(4) "Dealer" means any person (other than one engaged in rendering wire or radio communication service), regularly engaged in the business of offering wire communication equipment, for sale or lease at retail to the consumer.

(5) "Wire communication equipment" shall include new wire telephone and telegraph communication equipment of the kinds listed in Schedule A.

(b) **General restrictions. (1) Regardless of the terms of any contract of sale, purchase, rental or other commitment, no manufacturer, distributor or dealer shall sell, lend, lease, rent, deliver or otherwise transfer any wire communication equipment included in Schedule A attached, nor shall any person receive or accept deliveries of any such equipment from a manufacturer, distributor, or dealer, except to fill a purchase, rental or other order bearing a preference rating of AA-5 or higher. Provided, however, That this paragraph shall not prohibit the transfer or delivery of wire communication equipment to a manufacturer for repair or storage or the return of said equipment to the owner thereof after repair has been effected or storage terminated.**

(2) Notwithstanding the provisions of paragraph (b) (1), wire communication equipment, the order for which bears a preference rating of A-7 or higher and has been accepted by a manufacturer, distributor or dealer prior to January 2, 1943 or which bears a preference rating of A-1-a or higher and has been accepted by a manufac-

turer, distributor or dealer prior to April 1, 1943, may be manufactured and/or transferred and/or delivered.

(3) [Revoked July 23, 1943.]

(c) [Revoked Oct. 30, 1944.]

(d) **Applicability of regulations.** This order and all transactions affected thereby are subject to all applicable provisions of the regulations of the War Production Board, as amended from time to time.

(e) **Communications.** All reports required to be filed hereunder, and all communications concerning this order, shall, unless otherwise directed, be addressed to: Communications Division, Office of War Utilities, War Production Board, Washington 25, D. C., Ref.: U-5.

(f) **Appeals.** Any appeal from the provisions of this order shall be made by filing a letter in triplicate, referring to the particular provision appealed from, stating fully the grounds of the appeal.

(g) **Violations.** Any person who wilfully violates any provision of this order, or who, in connection with this order, wilfully conceals a material fact or further furnishes false information to any department or agency of the United States, is guilty of a crime, and upon conviction may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control, and may be deprived of priorities assistance.

(h) **Reports.** All persons affected by this order shall execute and file such reports as the War Production Board shall from time to time require, subject to the approval of the Bureau of the Budget pursuant to the Federal Reports Act, 1942.

Issued this 30th day of October 1944.

War Production Board,

By J. Joseph Whelan,
Recording Secretary.

Schedule A

General categories of wire communication equipment which, to the extent used in wire communication, are limited by Utilities Order U-5.

1. Exchange and toll telephone central office and P. B. X. switchboards and switching systems.

2. Telephones, including transmitters, receivers, dials, subscriber sets.

3. Telephone and telegraph repeaters and carrier systems.

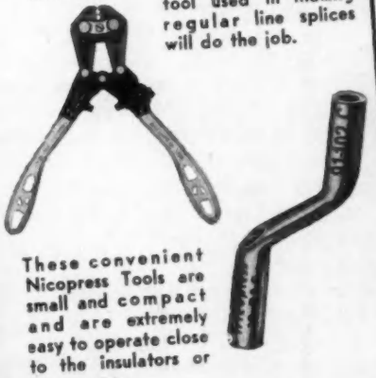
4. Telegraph switchboards, teletypewriters, printing telegraph machines and tape perforating machines.

5. Wire intercommunicating sets not using electronic tubes as an essential part.

STROMBERG-CARLSON
RECOMMENDS—

Nicopress
OFFSET
DEAD ENDS
offer Many
Advantages

1. They are designed for use on copper, Copperweld and iron wire.
2. Simplicity and speed of installation.
3. Strength and tightness.
4. Provide for a tail of any desired length.
5. No extra tools are required to make the offset dead end as the same tool used in making regular line splices will do the job.



These convenient Nicopress Tools are small and compact and are extremely easy to operate close to the insulators or cross arms.

SUB-CYCLE
"MASTER"
RINGING CONVERTER
No Moving Parts . . .
Nothing to Adjust

Sub-Cycle brings to the telephone field an exclusive development in an *alternating current* Power Ringing Converter which fully meets the requirements of operating companies.

It produces a powerful ringing current entirely independent of frequency variations in the commercial power supply.

Economical and quiet in operation, it does not interfere with radio and requires no routine maintenance.

Available in 6 models suitable for loads required for small P.B.X.'s to large central offices.

Output Capacities
7½ to 40/50 watts

STROMBERG-CARLSON
PROGRESS IN TELEPHONY

STROMBERG-CARLSON COMPANY
Factory and General Offices: Rochester 3, New York, U. S. A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

Electrical Fundamentals For the Telephone Man

(Continued from page 35)

Induction Type Wattmeter

ANOTHER type of wattmeter used in the power field for measuring A.C. power is the induction type. It has fixed current and voltage coils, and a metal rotor to which is attached the indicator needle. It operates on much the same principle of rotation as the single phase motor with the difference that the rotor is restrained from rotating except through a small arc by a spiral spring. This type of meter is not as popular as the induction type. Both the dynamometer and the induction wattmeter are primarily designed for power frequencies and are not suitable for use at frequencies much above 60 cycles.

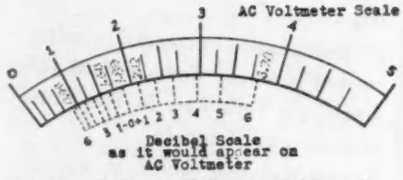


Fig. 73.—Ordinary Voltmeter Calibrated to read Level in Decibals (Zero level .006 watts—600 ohms)

Communication Wattmeter

WHEN dealing with communication and sound circuits it is often desirable to express the power output of an amplifier or the power input to or on a telephone line. Because the frequency is relatively high and the power to be measured is very low, wattmeters of the type just described are not suitable. For communication measurement it is customary to use **rectifier type A.C. voltmeters** as power measuring instruments. This is done by simply measuring the voltage across the load (whose impedance must be known) and the power is then computed by the relationship

$$P = \frac{E^2}{Z}$$

Where P is power in watts, E is voltage across load, and Z load impedance in ohms.

Calibration of Power Level Meters

WHAT are known as **power level meters** are also used for power measurements on communication circuits. They consist of copper oxide

Fig. 73-1.—Power Level Meter of Type used in Measuring aduio power in decibels.

type A.C. voltmeters calibrated in decibels for some fixed impedance. For example assume we have an 0-5 volt A.C. rectifier type voltmeter that is calibrated in decibels for a 600 ohm impedance, and that all readings are referred to a **zero level** of 6.0 milliwatts. The power level in dbs corresponding to any voltage reading is found by determining the ratio of the voltage at zero level to that at any higher or lower level.

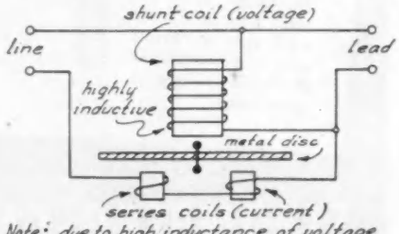
At zero level—$E = \sqrt{PZ}$

$E = \sqrt{.006 \times 600} =$ 1.90 volts (zero level voltage)

Having thus established the voltage for zero decibels, we can quickly determine the number of decibels corresponding to any other voltage reading by taking the ratio between any other voltage and the voltage at zero decibels and applying in the formula:

$$db = 20 \log \frac{E \text{ zero level}}{E \text{ any other level}}$$

Fig. 73 shows how the scale of an 0-5 voltmeter would appear if calibrated to read the power level in decibels instead of volts, and under the conditions of 600 ohms impedance and .005 watt zero reference level. A commercial power level meter is shown on Fig. 73-1.



Note: due to high inductance of voltage coil, flux lags behind voltage. Flux in series coils is in phase with voltage, thus the two fluxes provide a rotating effect.

Fig. 75.—Circuit of Induction Type D.C. Kilowatt Hour Meter

A.C. Kilowatt Hour Meters

COMMERCIAL power is sold by the **kilowatt hour hence meters** which will record the product of power and time must be used. These meters employ stationary voltage and current coils and an aluminum disc pivoted and arranged to rotate in the field produced by the coils. Some method of phase splitting (usually **shading coils)** is employed so that a rotating magnetic field results from the voltage and current in the two sets of coils. The shaft of the aluminum disc drives a gear train which records the product of time and watts on a dial.

Fig. 75 shows the essential elements of an A.C. kilowatt hour meter of the induction type. Another popular type of watt hour meter used on A.C. circuits is the mercury motor type. The meter consists essentially of a copper disc having a number of radial slots and arranged to float in a pool of mercury, a laminated structure on which is a potential coil, and terminals for introducing the load current into the mercury pool. Referring to

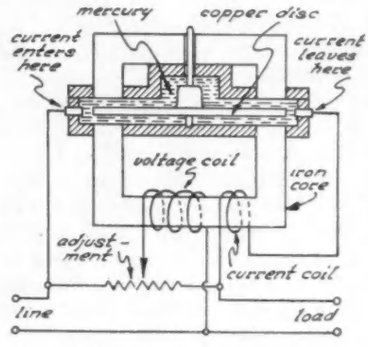


Fig. 76.—Circuit of Sangamo Mercury Type Kilowatt Hour Meter

Fig. 76 the action is as follows: The voltage coil produces flux which cuts the disc near its outer edges. Load current passes into the mercury through the disc and then on to the load via the two terminals. The radial slots in the disc cause it to pass directly across the disc. The interaction of the field produced by the load current in the disc due to the voltage coil causes the disc to rotate at a speed proportional to the product of voltage times current. The disc shaft drives a gear train which records the kilowatt hours consumed.

Kilowatt hour meters require occasional testing to insure that they are registering accurately. Testing is accomplished by comparing the power registered in a given time by the meter under test with that of a standard meter and under various load conditions. Kilowatt hour meters are provided with various adjustments which permit them to be regulated for light

loads, normal loads, and overloads. The recording gear train from a kilowatt hour meter is shown in Fig. 77.

(Questions for this section will be carried in our December 15 issue.)

Fig. 77.—Recording Gear Train from a Kilowatt Hour Meter

Somervell Discloses European Communications Network

Because the Germans wrecked most French telephone and telegraph systems, "our Signal Corps men are spreading their own communications network from the Atlantic towards the Rhine," Lieutenant General Brehon B. Somervell, Commanding General of the Army Service Forces told the New York Herald Tribune Forum during mid-October as one of the many examples of the "sweaty, unromantic" jobs of the ASF in bringing about the ceaseless flow of munitions and supplies to the combat fronts in Europe.

General Somervell said that the American officers and men on the front and in this country had done the impossible and that in the first 109 days of the invasion, the Allies put ashore more than twice the total of supplies that General Pershing received in the 19 months of the first World War. He stated that Under-secretary of War Patterson and he had observed and studied communications operations in both Normandy and Southern France shortly after the beachhead invasions.

Methuselah of Telephone

A telephone 1,000 years old was discovered in the ruins of a Peruvian palace. It consists of two gourd necks, one end of each covered with hide. A cord attached to the hide and pulled taut carries the sound of a human voice.

Plan Now to Use

Crapo HIGH-TENSILE LINE WIRE!

FAR-REACHING, stored-up demands for rural telephone service can be met speedily and economically, after the emergency, with Crapo High-Tensile Line Wire. Long-span lines, made possible by Crapo HTL-85 and Crapo HTL-135 Line Wire, go up faster, require less labor and material, than lines of standard span length.

In planning tomorrow's program for the extension and rehabilitation of rural circuits, be sure to take full advantage of the superior physical characteristics of these wires!

Crapo HTL-85, with 60% greater tensile strength than standard B.B. wire, permits spans of 225 feet in heavy loading to 375 feet in light loading areas. Crapo HTL-135 possesses two and one-half times the strength of B.B., makes possible extra long spans of 350 feet in heavy loading, 500 feet in light loading districts. Both Crapo HTL-85 and Crapo HTL-135 provide superior tranmisssion at voice-frequency.

Write for Technical Information!

Send today for Bulletins No. 201 and No. 202 containing physical, electrical and sag and tension data and construction practice information! Or, contact your distributor of Crapo Galvanized Telephone Wire and Strand.

INDIANA STEEL & WIRE COMPANY · MUNCIE, INDIANA

FOR QUICKER EASIER TRIMMING WORK
use SEYMOUR SMITH TOOLS...
TREE TRIMMERS
POLE SAWS
BRUSH CUTTERS
CABLE CUTTERS
JOINTED TEST-PIKE POLES
A line of tools designed for linemen's use that are standard equipment with the world's largest Utility Companies.
Send for folder and prices of this labor saving equipment.

What Has the War Taught Us!

(Continued from page 30)

an opportunity to cooperate voluntarily. You no doubt will agree that better results are obtainable whenever anything which smacks of coercion can be avoided.

Closely tied up with this measure is an advertising program which has peacetime application. We have used the press and the radio to continually put before the public, telephonic problems which could be met only through public cooperation, always in a way which **suggested** the advantages to be gained by the public through friendly cooperation.

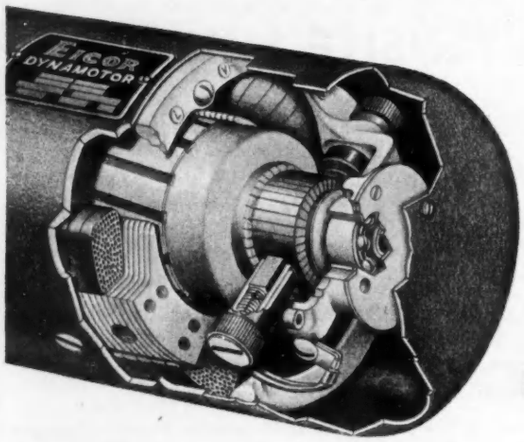
An example of what can be accomplished through such publicity was the receiver-off-the-hook situation. We publicized it through a continuing spot radio broadcast, with the result that our permanent signals which could be attributed to this issue have dropped an average of 700 per month, which is a 9% decrease.

Thus far we have been placing the emphasis on people, principally, for two reasons. First, because regardless of the quality of the equipment and materials which we may use in our plant, our service will always be measured by the desire of our employees to serve and the success which we have in securing public cooperation; and second, because this matter of conservation of materials and equipment which has come to full bloom during the war is an old story to the small independent company.

However, there are several aspects to the material and equipment situation which will bear emphasis.

Consider the matter of new styles of equipment. If we are to believe the stories told to us by manufacturers, we can expect an era of rapid development during the post-war period. This means that the public will be stirred up by manufacturing progress during a period of station deflation, which will adversely affect our ability to stave off premature retiring of equipment. Two considerations are involved here: First, those of us who are financially able to purchase new styles as they are developed must organize plans for diluting the existing equipment, possibly without too much help from the state regulatory bodies, in a manner which will protect our customer relations. Second, the resultant availability of good used equipment. With respect to the former consideration, assuming that the "first come first served" principle is fraught with danger, particularly for the small companies, one of the approaches which could be considered is: As a new style is adopted, its use could be confined to a certain class of service, based on station activity. That is based on the class or classes of service which will develop a station activity of sufficient volume to absorb the purchases which you are prepared to make. With respect to the second consideration, that is, the surplus of used equipment, the companies who are not forced to purchase newly developed sets as they are produced have an excellent opportunity to consider replacement of their present equipment with sets which are thrown onto the market, both because companies have been forced to adopt new equipment and because of the station deflation which may occur.

It would be a mistake, however, to talk of set replacements and ignore the broad preventive maintenance program on the belief that many smaller



Isometric Cut-Away View of an

EICOR DYNAMOTOR

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EICOR produces a Dynamotor for *every* need—from the smallest in size to the largest in output. Our complete line of frame sizes makes possible the greatest available range of dynamotor output ratings, sizes and weights.

WALL CHART AVAILABLE

18" x 24" reproduction of this isometric cutaway, complete with dynamotor data on outputs, sizes and weights available without charge to engineers and instructors. Write for it on company or official letterhead.

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companies through sheer necessity have been forced to defer needed maintenance and will be forced, therefore, to re-organize their regular maintenance program as soon as labor and material are again available.

WITH respect to preventive maintenance, we can say that the Rochester experience has been that the more intensive the program becomes, the more able we are to absorb unavoidable increases in operating costs. We believe we know this subject because we have stuck to our guns on the value of preventive maintenance, both before and during the war, with the result that we have had fewer service failures, fewer complaints, and hence better public relations, and in addition an appreciable absorption of the uncontrollable operating expenses incidental to the conduct of the war.

Here are some of the aspects of our normal preventive maintenance program which I recommend to you without reservation.

Our open wire program is divided into two parts, namely, toll and exchange. The toll lines are patrolled twice a year on light trips which consist of a fairly rapid visual inspection of the lines to correct irregularities which require immediate attention, such as debris on wires; defective insulators, pins and ties, and broken and loose brackets; broken or leaning poles; inspection of toll cable terminals including protectors and jumpers. Once a year the toll lines are patrolled on a heavy trip in order to replace defective cross-arms, straighten crooked arms, pull slack, in addition to repeating all the items covered on the light trip. All toll pole butts are inspected once every three years. During the heavy trip a survey is made of the tree conditions in order to organize the winter tree trimming program. This program is usually commenced about November 1 and completed about May 1.

Maintenance of exchange lines is carried on in a similar manner, except that a larger portion of the inspection is made from the ground.

The highlights of our central office program are as follows: Jacks are gauged on the following basis, trunk jacks semi-annually, answering jacks annually, and multiple jacks bi-annually; all toll lines receive a daily talking and ringing test; all switchboard cords are tested weekly; all answering jacks are tested weekly; insulation tests are made quarterly on all lines; in the large central office all lines are subjected to a 200 volt breakdown test semi-annually.

Gray Paystations—

1. Serve More People
2. Eliminate "Free" Calls
3. Provide Convenience
4. Increase Revenue

Introducing the
New 60 Series

The new Type 60 Series of Gray Paystations are equipped with the exclusive and unique balanced anti-sidetone circuit used in the very newest types of Automatic Electric telephones, assuring exceptional transmission quality. Available in handset or conventional style for automatic or manual exchanges and for postpay or prepay operation.

Right now there's added incentive in increasing your paystation lines. Aside from the added revenue, paystations fill a definite place in the needs of a nation at war.

They provide service for many people who, under present regulations, are unable to obtain private telephones. They furnish the ideal answer for telephone convenience in army camps, in war plant areas and in new housing developments. Installed in plants and offices, they give employees a handy means of making personal calls and at the same time keep the regular switchboard lines free for vital business traffic.

Why not check your paystation lines now, and look for the added possibilities in your locality?

WRITE FOR CATALOG 4078

A complete reference to all types of Gray Paystations as well as a guide book to the best kind of paystation to suit your particular needs. Write for it today—it's yours for the asking.

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THE cable maintenance program essentially involves a visual inspection of all cable sheath and terminals on a continuing basis. This includes inspecting and cleaning terminals, replacing broken or missing pole steps, replacing missing rings and clamps, placing grade clamps where necessary, re-painting wood terminals and trimming all trees wherever there is exposure to abrasion.

The subscriber station program involves a complete inspection of each station visited because of a trouble report, unless during the preceding twelve-month period the telephone was either installed or had received such an inspection.

This inspection includes a talking and ringing test, and a visual inspection of the entire installation. If it is practicable to make the necessary repairs at the time of the inspection, the repair work is performed immediately. It it is not practicable to make the necessary repairs, either due to the current work load or because extensive work is required, a work order is prepared, and the work is executed under more convenient circumstances. Station wiring is not replaced solely because of appearance—such work is performed only if the existing installations offers potential sources of trouble.

In conclusion let me again state that both in war and peace time we have found that applying the Chinese philosophy of "paying the doctor to keep us well" to our telephone plant reduces unit costs, reduces complaints, improves customer relations, and therefore is one of the largest steps we can make in meeting our objective of the best telephone service possible at the lowest possible cost.

REPLYING TO YOUR LETTER OF YESTERDAY

SERVICE *is our watchword!*

. . . and while we are handling many special jobs for the Army and Navy and other military needs we are proud of the fact that we have been able to continue to serve our regular customers with comparatively short delays.

Our 18 years spent specializing in precision rebuilding of transmitters has seen this department grow to be the largest of its kind in the country.

If it is used in the telephone industry and needs repairing or rebuilding our superior workmanship and moderate prices will be attractive to you.

DANIEL H. McNULTY, President & Manager

TELEPHONE *REPAIR* & *SUPPLY* COMPANY

'Since 1926'

Rogers Park Station, Chicago 26, Illinois

"Fungus Farm"

One of the most unusual farms in the country, the Wall Street Journal reported recently is the "fungus farm", established by General Electric at the insistence of the Signal Corps to aid it in its "tropicalization" preventive. The farm was started 8 months ago.

Rates on Calls to Hawaii Reduced

Rates for overseas radiotelephone service to Hawaii from about two-thirds of the states in this country were reduced November 1, according to an announcement of the American Telephone and Telegraph Company. In addition, radio-telephone rates to Jamaica from all United States points are reduced as well as charges from about one-third of the states on calls to the Bahamas.

The amount of the reductions ranges from $.75 to $1.50 with respect to Hawaii and the Bahamas and from $4.50 to $8.25 on Jamaica calls. These arrangements have been made in conjunction with the Mutual Telephone Company of Hawaii; the Bahamas Government Telecommunications Department; and Cables and Wireless, Ltd. which, through the Jamaica Telephone Company Ltd. provides service at Jamaica.

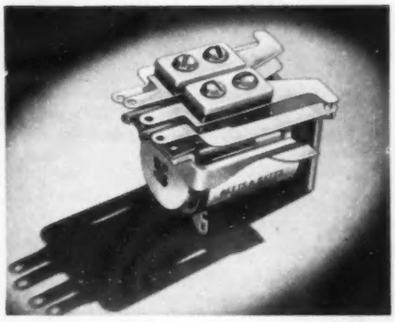
Lincoln Telephone and Telegraph Company Honored

John H. Agee, vice president and general manager of the Lincoln Telephone and Telegraph Company, received on behalf of the company a Certificate of Appreciation at a ceremony held at the Cornhusker Hotel in Lincoln. This is the highest honor bestowed by the U. S. Signal Corps to telephone companies for "loyal and patriotic service" during wartime. Repsentatives of the Chief Signal Officer made the presentation.

The Army-Navy "E" flag with its fourth renewal star is raised at Leeds & Northrup Company. Good for a year instead of six months as in previous awards, this star means the Navy, which made the Award to the men and women of Leeds & Northrup, is more than ever pleased with their production of control instruments and furnaces.

New Telephone Type Relays

Betts and Betts RAC midget type relays are especially designed for communication, electronics and aviation applications. These components meet rigid Army Air Force tests for altitude, vibration, shock, humidity and extreme temperatures. Dimensions only 1 7/16" long, 1" wide and 1 1/16" high including first two pairs of contacts. Each additional two pairs of contacts add 1/8" more. Weight 1 3/4 ounces.



Coils are protected against moisture, corrosion and electrolytic action and have voltage range from 1 1/2 to 70v DC. A highly efficient magnetic circuit permits operation with plus or minus 25% voltage fluctuation.

Additional information may be obtained from Betts & Betts Corp., 551 W. 52 St., New York 19, N. Y.

1945 BLUE BOOK See Pages 52 & 53

Phone Experts Study War Front Problems

Close collaboration between the armed forces and Bell Telephone Laboratories extends beyond the creation and design of modern war communications equipment. It also includes observation and testing under actual battle conditions.

During a three-month tour of European and Mediterranean war theatres made at the request of the War Department, by A. B. Clark, the Laboratories' director of Systems Development, and Albert Tradup, a supervising engineer on his staff, a first-hand study was made of problems connected with mobile and fixed communications equipment in Newfoundland, England, Scotland, North Africa and Italy. Accompanied by H. H. Beverage of RCA Laboratories, the Bell men made the 15,000-mile trip by Army air transport.

On the Fifth Army front in Italy they were in areas subjected to enemy shelling and bombing. The trio was in England on D-Day and during the ensuing weeks followed closely the progress of establishing communications on the Normandy beachhead. They were impressed by the great amount of communications plant which had been built in both North Africa and Italy.

You Simplify the Whole Ringing Job When You Install

SUB-CYCLE

For once it's connected, you can forget it, for it requires no routine maintenance, will not interfere with radio reception, and there are no moving parts, nothing to adjust.
SUB-CYCLE goes right on—day after day—delivering a powerful, quiet, economical signaling service.
Made in 6 models for loads from small PBX to large Central Office.

ALSO PULSATORS
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THE LORAIN PRODUCTS CORPORATION
LORAIN OHIO

P & H PENTA POLES

FULL-LENGTH TREATED NORTHERN WHITE CEDAR

TWELVE REASONS WHY
LEADING TELEPHONE COMPANIES STANDARDIZE ON PENTA POLES

No. 11 . . . P & H Penta treatment is non-conductive and non-corrosive.

Watch for Reason No. 12

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MINNEAPOLIS, MINNESOTA · 50 CHURCH STREET, NEW YORK, N. Y.
"STILL IN THE LEAD"

Phone Splicers Aid Army Overseas

A new and dramatic experience came to 30 Bell Telephone System cable splicers who volunteered for emergency duty in Europe to help build communications lines in territories from which the beaten Nazis have been driven.

Prepared for what the U. S. Army Signal Corps called "arduous duty," the men were to work side by side with Signal Corps personnel. They were granted leaves of absence from the Bell System and reported to the army in Washington, D. C.

After being given rigorous physical examinations in Washington by the army, passports were provided, other necessary arrangements made, and the men were flown across the Atlantic Ocean in army planes. They wore uniforms provided by the army with arm bands to distinguish them from regular army personnel.

Giesler Buys Dodge Center, Minn. System

Pete Giesler has bought and taken possession of the Dodge Center, Minn. telephone system from J. R. Springsted, who has owned and operated it for many years.

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When you get the green light to resume operations on a normal scale, be prepared with tools that will take you out of the "traffic jam" at top speed—and at lowest cost.

Among such tools are Vacuum Grip Pliers, engineered to back the skill of the lineman and electrician with swift and telling precision. Time savers that help to make manhours more productive, and to put tough jobs through faster.

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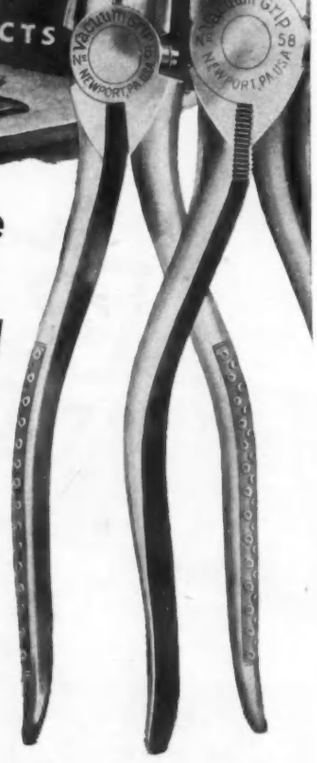

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REG. U.S. PAT. OFF.

Reorganization of New Jersey Commission

A complete reorganization of the New Jersey Board of Public Utility Commissioners to improve its regulation of public utility rates has been proposed by Commissioner Crawford Jamieson. He suggested in hearings before the New Jersey lower house that the board's generalized supervision of public utilities be replaced by divisional units to concentrate on the regulation of the different utility fields.

No one in the commission knows anything about public utility rates, he asserted, and "as a result there has been practically no regulation of these rates since the commission was established". He claimed that the reorganization would reduce the board's expenses and would mean the revision of rates in the state which were "among the highest in the country". One of the divisions would handle telephone regulation, it was proposed.

Morris H. Cook has been appointed director of specialty products development of Bell Telephone Laboratories and will be responsible for the laboratories' overall program in that field. He comes from Hawthorne Works of the Western Electric Company where he was superintendent of manufacturing engineering.

An electrical engineering graduate of the University of Illinois, Mr. Cook had experience in several companies, and entered the manufacturing engineering organization of Western Electric in 1926. He became development engineer for telephone station apparatus in 1929, and progressed through various responsibilities to become superintendent of manufacturing engineering, first in 1940 for station apparatus and then in 1941 for the special apparatus shops at Hawthorne.

Electronic Bulletin

Nine types of electronic tubes for specialized applications are described in a new 24 page bulletin published by Sylvania Electric Products, Inc. Products described include strobotrons for the study of reciprocating and rotating motion; Pirani and thermocouple tubes for measuring vacuum; voltage regulator tubes; facsimile tubes; germicidal tubes; black light and near ultraviolet lamps. Technical sections of the bulletin give specifications, basic circuit diagrams and suggested applications for products and accessories. Fluorescent lamp characteristics are given in tabular form and curves. Copies of Bulletin 202 are available on request to Sylvania Electric Products, Inc., Special Products Division, 60 Boston Street, Salem, Mass.

Kellogg Furnishes Observer

Through arrangements made with the War Department, D. H. Erickson, a member of the Kellogg Switchboard & Supply Co., Engineering Department, has been assigned the duty of "Technical Observer" and will spend the next 6 to 12 months at the battlefronts overseas.

He will wear an officer's uniform, but without insignia except for a special orange colored armband with the letters "T. O." It is the duty of the Technical Observers to report on various specified equipment while in actual combat operations. The work of these specialists also includes giving assistance in the maintenance, installation and operation of the technical equipment.

While on this assignment, Mr. Erickson will observe the Army's communication equipment, particularly that manufactured by Kellogg, and report directly to the War Department. In consummating the arrangements with the Kellogg Company for the transfer of one of its engineers to this important, field work, the government planned to send Mr. Erickson to various parts of the world where active combat is in progress.

Mr. Erickson holds a degree in Electrical Engineering from the University of Minnesota and has specialized in communications. He has had experience as a lineman and trouble shooter for an Independent telephone company in North Dakota and for three years was associated with a firm of consulting engineers. Since becoming associated with the Kellogg Engineering Department, he has devoted attention to equipment engineering, inspection engineering, and to apparatus engineering, handling various requirements in connection with U. S. Army Signal Corps' equipment.

Merton R. Hartnell

M. R. Hartnell Joins Drake Electric Works

Drake Electric Works, Inc., Chicago manufacturer of electric soldering irons, announces the appointment of Merton R. Hartnell as assistant to the president, Walter M. Kuehl. Mr. Hartnell was previously, for eight years, plant manager of Conelly Iron Sponge and Governor Co.

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Kellogg No. 801 S. A. Common battery Steel hotel sets with enclosed gong ringer & Booster Coil	9.50
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Kellogg, W. E., Dean or S. C. New Mouthpieces @	.08
Kellogg No. 1025 C. B. Lineman test set with 2 Cond. cord less test clips	4.25
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48 Volt Swbd. Lamps Per 100 @	5.00
Dean Talk Through repeating Coils @	.75
Stromberg Carlson No. 951 C. B. Straight line oak wall Telephones with Ind. Coil in Ckt. @	6.00
Stromberg No. 14A C. B. Ind. Coils @	.45

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is not unusual these days. Patience is asked by the Postoffice Department if mail is slow.

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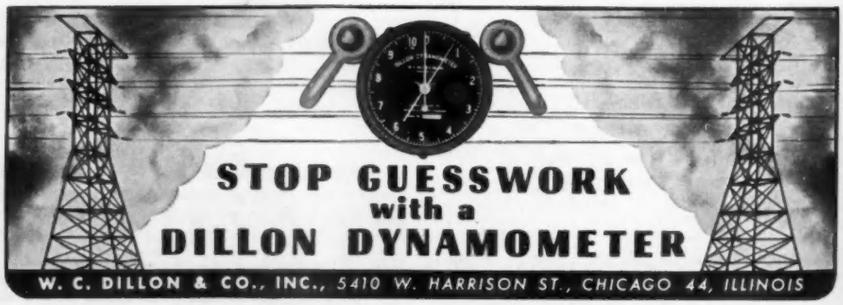
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